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ABSTRACT

This report presents existing workforce levels, training programs and career potentials and develops staffing level projections (1976-1982) based on available information for the State of New Jersey. The study concerns itself with the environmental pollution control areas of air, noise, potable water, pesticides, radiation, solid waste, wastewater, and energy. The format includes workforce profiles, projections, growth and career options for each of the areas investigated. Additional sections of the report outline state legislation and selected post secondary institutions with formal Environmental/Energy programs. A state profile and summary is included for cross-reference. The selected bibliography is appended in the Region II report. This document is one in a series of 69 which presents information for each of the states, Washington, D.C., Puerto Rico, and the Virgin Islands, and national and regional summaries. (CS)

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A National Environmental/Energy Workforce Assessment

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SE 023 322

NATIONAL ENVIRONMENTAL/ENERGY

WORKFORCE ASSESSMENT

for

NEW JERSEY

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

Grant #T900591010

1977

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TABLE OF CONTENTS

	Page
ILLUSTRATIONS	iii
ACKNOWLEDGEMENT	v
PREFACE	vi
FOREWORD	vii
STATE SUMMARY	1
STATE PROFILE	14
POLLUTION CONTROL AND ABATEMENT AGENCIES	16
POLLUTION CONTROL AND ABATEMENT PROGRAMS	20
I. Air	21
II. Noise	29
III. Pesticides	38
IV. Potable Water	46
V. Radiation	56
VI. Solid Waste	67
VII. Wastewater	74
VIII. Energy	84
SELECTED POST SECONDARY INSTITUTIONS WITH FORMAL ENVIRONMENTAL/ENERGY PROGRAMS	86
STATE LEGISLATION	90

NOTE: The Selected Bibliography is appended to each Regional Report.

ILLUSTRATIONS

Figure		Page
1	New Jersey, Attainment Status of National Ambient Air Quality Standards by Air Quality Control Region.	23
2	Department of Environmental Protection, Organizational Chart	27
3	Bureau of Radiation Protection, 1977-78.	66
4	Division of Water Resources, Organizational Chart.	83

Table		
I	New Jersey Department of Health, Bureau of Air Pollution Control, Current (1975) Staffing Level.	24
II	New Jersey Department of Health, Bureau of Air Pollution Control, Workforce Projections to 1982 (est.).	25
III	State of New Jersey, Municipal Noise Ordinance.	31
IV	New Jersey Department of Environmental Protection, Office of Noise Control, Current (1976) Staffing Level.	34
V	New Jersey Department of Environmental Protection, Office of Noise Control, Workforce Projections to 1982 (est.).	35
VI	New Jersey Department of Health and Department of Environmental Protection, Pesticide Programs, Current (1976) Staffing Level.	41
VII	New Jersey Department of Health and Department of Environmental Protection, Pesticide Programs, Workforce Projections to 1982 (est.).	42

Table		Page
VIII	New Jersey Department of Environmental Protection, Division of Water Resources, Bureau of Potable Water, Current (1976) Staffing Level.	49
IX	New Jersey Department of Health, Potable Water Programs, Current (1976) Staffing Level.	50
X	New Jersey Department of Environmental Protection, Division of Water Resources, Bureau of Potable Water, Workforce Projections to 1982 (est.).	52
XI	New Jersey Department of Health, Potable Water Programs, Workforce Projections to 1982 (est.).	53
XII	State of New Jersey, Nuclear Power Facilities.	60
XIII	New Jersey Department of Environmental Protection, Bureau of Radiation Protection, Current (1976) Staffing Level.	62
XIV	New Jersey Department of Environmental Protection, Bureau of Radiation Protection, Workforce Projections to 1982 (est.).	63
XV	New Jersey Department of Environmental Protection, Solid Waste Administration, Current (1976) Staffing Level.	70
XVI	New Jersey Department of Environmental Protection, Solid Waste Administration, Workforce Projections to 1982 (est.).	71
XVII	New Jersey Department of Environmental Protection, Division of Water Resources, Wastewater Programs, Current (1976) Staffing Level.	76
XVIII	New Jersey Department of Environmental Protection, Division of Water Resources, Wastewater Programs, Workforce Projections to 1982 (est.).	78

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PREFACE

This report presents existing workforce levels, training programs, and career potentials and develops staffing level projections (1976 - 1981) based on available information for the State of New Jersey in the environmental pollution control areas of air, noise, pesticides, potable water, radiation, solid waste, waste water, and energy. This study was carried out for the United States Environmental Protection Agency by National Field Research Center of Iowa City, Iowa.

The information and data presented in this report were compiled in large part from extensive interviews with professionals working in the respective areas and were supplemented by telephone surveys and research.

FOREWORD

The material herein contains the information and data collected for eight individual pollution control inventories conducted for New Jersey. The format includes workforce profiles, projections, growth and career potential for each of the areas investigated. Growth projections are necessarily based on best professional estimates developed from available information and represent what are felt to be realistic figures by experts in the respective areas. The pollution control areas considered by this study are as follows:

Air

Noise

Pesticides

Potable Water

Radiation

Solid Waste

Waste Water

Energy

National Environmental Energy
Workforce Assessment

Phase I

NEW JERSEY

State Summary

I. AIR

The Bureau of Air Pollution Control of the Division of Environmental Quality has a staffing level of 175 persons at present. They are grouped into four occupational categories. The largest category is scientists which is composed chiefly of environmental specialists. Program officials indicate that most of the environmental specialists have degrees in biology. The engineer category is composed of environmental engineers. The technicians are environmental and electronic technicians, who do not require a college degree.

Program officials indicate that staffing levels can be expected to increase to approximately 221 persons, or a five percent increase per year over the next five years. Program officials expressed a definite need for increases in work-force, especially in planning activities. The greatest opportunity will still exist for environmental specialists; however, significant opportunities for engineers and technicians are also expected to develop. Only minimal growth in the program is anticipated over the next five years, thus delimiting career potential.

II. NOISE

The New Jersey Office of Noise Control is located within the Division of Environmental Quality in the State's Department of Environmental Protection (DEP). The Office is responsible for the enforcement of rules to control community noise emanating from industrial and commercial sources. DEP's authority in control covers all environmental noise problems, which includes industrial establishments.

The New Jersey Noise Control Act of 1971 authorizes the state to promulgate and enforce codes, rules, and regulations to control and abate noise. The only regulations thus far are those setting standards for industrial and commercial operations. The State Noise Control Act also specifies that ordinances and laws of local governments which are not consistent with the state regulations would not be superceded.

The Noise Control Council, within DEP, consists of 13 members of various state agencies and nine members appointed by the Governor to include a medical doctor, an industrialist, an ecologist, a civil engineer, and a member of a local governing body.

Five persons currently work on the noise control program which continues to exist although the Office of Noise Control no longer exists in the state budget. Personnel assigned to the Division of Environmental Quality employed by the noise control program include one engineer, one scientist, one technician, and two clerks. The program is expected to acquire approximately 18 new positions over the next five years.

III. PESTICIDES

New Jersey's pesticide program is the responsibility of the Office of Pesticide Control within the Division of Environmental Quality of the Department of Environmental Protection (DEP). The Office controls the administration, labeling, use, transportation, storage, sale, and disposal of pesticides and pesticide products.

The current staffing level of the state's pesticide program consists of ten people classified as scientists, technicians, and laboratory technicians. Scientists have degrees in environmental science, biology, or chemistry, and those holding technician positions perform field inspection activities.

Program officials in the Office of Pesticide Control have indicated that an immediate need exists for five additional people. It is anticipated that additional scientists and technicians will be hired in 1977. After the initial increase of five persons, program professionals anticipate that the workforce level will stablize and show only a slight increase through 1981. Career potential will exist for those professionals with a four-year degree in one of the natural sciences such as agricultural science or chemistry and for technicians, primarily in the field inspection activities.

IV. POTABLE WATER

The Bureau of Potable Water, which is part of the Division of Water Resources in the Department of Environmental Protection (DEP), has the responsibility for the water supply program in New Jersey.

New Jersey has undertaken to assume all aspects of primary enforcement responsibility in accordance with the federal Safe Drinking Water Act (SDWA) and the federal regulations promulgated thereunder. At this time, New Jersey cannot undertake the necessary supervision required by the SDWA because of the state's critical financial situation.

The current staffing level of the Bureau of Potable Water is 17, seven of whom are engineers. Engineering positions require a degree in the engineering sciences and are normally filled by persons with chemical or sanitary engineering backgrounds. The Bureau also has one sanitarian and five technicians on its staff. DEP contracts with the Department of Health for needed laboratory services for the microbiological and chemical testing of water samples. Half of the employees are professionals, including six chemists and a biologist.

Personnel within the Bureau of Potable Water are projected to increase at a rate of approximately 16 percent per year over the next five years. The Health Department expects to hire five persons, including chemists and lab technicians for water supply support activities by 1981.

V. RADIATION

New Jersey's radiation activities come under the jurisdiction of the Bureau of Radiation Protection located within the Department of Environmental Protection (DEP). New Jersey has ten nuclear power plants in operation, under construction, under review for permit, or announced.

The current staffing level of the Bureau is 41. The program is composed primarily of scientists who are radiation physicists. Others are radiation chemists, research scientists, radiation specialists, and an environmental specialist. All of these people have four-year degrees and most have specialized training in radiation control. The program also has a nuclear engineer, six technicians who are radiation or X-ray technicians, and ten clerks.

Program personnel have indicated that a moderate increase in personnel to 12 is anticipated over the next five years. Most of these will probably be physicists or chemists with training in radiation activities.

The field of environmental radiation can also be expected to grow in the private sector with the addition of several nuclear facilities, two of which are expected to be operating by 1981.

VI. SOLID WASTE

The New Jersey Solid Waste Management Act of 1970 gave authority to the Department of Environmental Protection (DEP) for the registration and evaluation of all solid waste facilities within the state. Those functions are now handled by the Division of Solid Waste Management which has responsibility for the development and formulation of statewide, regional, county, and intercounty plans for solid waste management, including the disposal of chemical and hazardous wastes.

New Jersey's solid waste program has a current staff of 40 people, about half of whom are engineers. Their degrees are in chemical, civil, mechanical, or environmental engineering. There are also ten persons classified as scientists with backgrounds in chemistry, geology, and sanitation.

Officials within the Division anticipate the staffing level to double within the next two years. Most of the additional personnel will be technicians. Personnel are also needed for planning and design for the management of hazardous and chemical wastes.

Careers will tend to move away from conventional landfill and incinerator operators to more highly trained individuals for resource recovery operations. The greatest opportunities will exist for engineers and scientists in the planning, design, and operation of these facilities.

VII. WASTEWATER

In New Jersey, the State Department of Environmental Protection (DEP) has the legal authority and responsibility for the control of water pollution and water quality planning and management. These programs are administered within the Department by the Division of Water Resources.

To carry out its activities, the Division has a staff of 273 at this time. They include engineers, scientists, and technicians. The engineers are primarily environmental engineers which requires a minimum of a bachelor's degree in civil, sanitary, mechanical, or environmental engineering. The scientists are environmental scientists, biologists, chemists, or geologists. The technicians are environmental technicians, construction inspectors, and operating personnel. The State Department of Health Division of Laboratories has a staff of ten persons, including chemists and lab technicians water quality work for the Division of Water Resources.

Substantial growth in New Jersey's water quality program is anticipated by program officials. A projected need exists for an estimated 50 percent staffing increase over the next year, followed by increases of five to ten percent per year thereafter. This staffing increase is expected to be for engineers and scientists.

It is estimated that the Health Department may require a doubling in staff from ten to twenty persons for its water quality program.

VIII. ENERGY

New Jersey is currently heavily committed to the construction of nuclear power electrical generating plants. Two plants are now operating; six more are planned or under construction and are anticipated to be completed by the late 1980's. Should all be completed, they will have a total generating capacity of 8,349 megawatts.

The Cabinet Energy Committee, created by executive order to advise the Governor on the development and implementation of energy policy, is made up of the administration of the state energy office, the Attorney General, and various other representatives of state agencies.

The Energy Crisis Study Commission is an investigatory commission composed of private citizens, cabinet officers, and legislators. It was created by the legislature to study energy-related matters. It has a staff of nine who are charged with the tasks of identifying and analyzing energy problems, recommending policy action, promulgating regulations for the sale of motor gasoline, and coordinating energy matters among the various Departments of the State.

STATE OF NEW JERSEY - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)

Environmental Area	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR[1]	175	183	192	201	211	221	5%
NOISE[2]	5	5	12	16	19	23	43%
PESTICIDES[3]	10	15	16	17	18	19	15%
POTABLE WATER[4]	31	44	46	48	50	53	12%
RADIATION[5]	41	45	52	52	52	53	6%
SOLID WASTE[6]	40	60	70	80	84	88	18%
WASTEWATER[7]	283	422	460	490	512	525	14%
ENERGY[8]							N/A
TOTALS	585	774	848	904	946	982	12%

[1]The above represents only personnel of the Bureau of Air Pollution Control.

[2]The above does not include law enforcement agencies or the private sector for which figures were not available.

[3]The above includes state program personnel, but does not include an estimated 5000 commercial and 15,000 private applicators that will require certification.

[4]The above includes personnel of the Bureau of Potable Water and of the Health Department but does not include water supply and water treatment plant operators for which figures were not available.

[5]The above includes only state agency personnel.

[6]The above does not include private sector personnel for which figures were not available.

[7]The above includes personnel of the Division of Water Resources and of the Health Department but does not include an estimated 1042 certified wastewater treatment plant operators for which projections were not available.

[8]No figures were available at the time of the preparation of this report.

EDUCATION

The colleges and universities of New Jersey have a variety of environmental education programs. Some of the more notable programs include those of Cock College, Rutgers, The State University of New Jersey; Stockto State College; Middlesex County College; Princeton University; and Stevens Institute of Technology.

Cook College offers both undergraduate and graduate programs in environmental science and additionally, conducts environmental training courses for the state's Department of Environmental Protection. Stockton State College has undergraduate programs in environmental studies with options in environmental science and analysis, management and planning, and environmental issues. Middlesex County College offers a technician training program in environmental health sciences leading to a two-year degree. Princeton University offers undergraduate programs in both environmental sciences and environmental studies and operates a Center for Environmental Studies. Stevens Institute of Technology has a minigraduate program in air pollution engineering as well as an undergraduate concentration in sanitary-environmental engineering.

In addition to the above schools, several other colleges and universities have environmental curricula. These include William Patterson College, Bergen Community College, the County College of Morris, Union College, Trenton State College, Burlington County College, and Montclair State College. There are also a number of additional schools offering environmental courses as part of other degree programs.

LEGISLATION

The environmental/energy legislation for New Jersey was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Department of Environmental Protection Act

Environmental Rights Act

Air Pollution Control Act

Noise Control Act of 1971

Pesticide Control Act of 1971

Radiation Protection Act

Solid Waste Management Act

Waste Control Act

Motor Vehicle Junk Act

Coastal Wetlands Protection Act

Clean Ocean Act

Superintendent and Operator Licensing Law

Water Pollution Control Laws

Water Quality Improvement Act of 1971

National Environmental Energy
Workforce Assessment

Phase I

NEW JERSEY

State Report

STATE PROFILE

With 7,836 square miles, New Jersey is the smallest of the Middle Atlantic states. It has the highest population density of the 50 states (953.1 people per square mile) totaling 7,316,000 in 1975 which places it ninth among the states. Yet, 63 percent of its land area is in farms or forests. New Jersey is a state of contrasts between rural and urban, poor and wealthy, and parochial and cosmopolitan.

The state has four distinct areas: rugged hills in the northwest, rolling horse country south of the hills, a central plain extending to the northeast (the metropolitan area), and the southern coastal plain. The metropolitan area is comprised of the five northeastern counties. Principal cities are Newark, Jersey City, Paterson, and Elizabeth. The area is dominated by its proximity to New York City and Philadelphia. An estimated 160,000 workers leave for the former daily, and 90,000 go to work in the latter.

New Jersey is heavily industrialized. It ranks seventh among the states in value added by manufacture, which totals more than $17.7 billion per year. Its first place position in chemical products is a combination of large pharmaceutical, synthetics, basic chemical, and paint industries. It is a leading state in apparel, food processing, electrical and other machinery, stone-clay-glass products, printing, rubber, plastic, and petroleum products. Large refineries process out-of-state oil at a capacity exceeding 500,000 barrels of crude oil a day.

1975 per capita income was $6,629, fifth highest in the country. Farm receipts were $331 million in 1975, two-thirds of which were crop-derived. Tomatoes, corn, asparagus, and apples are major crops. Poultry and dairy products are also important. Income per acre is the highest in the nation. Mineral production amounted to $122 million in 1975 and was mainly from sand, gravel, and building stone. Commercial fishing receipts totaled more than $19 million in 1975.

Tourism is a $1.2 billion business. New Jersey has more than 100 resorts, 55,717 acres in 40 state parks and 176,652 acres in 10 state forests.

New Jersey's swamp and meadow lands are on the verge of being developed because of their location. Hackensack Meadows are now being dredged, filled, and used as dumps. New Jersey faces a difficult period as it determines its course in issues of pollution, congestion, noise, and land use.

NEW JERSEY POLLUTION CONTROL AND ABATEMENT AGENCIES

The New Jersey Department of Environmental Protection is the principal state environmental agency. The Department is divided into various organization units, including the Office of the Commissioner; Division of Administrative Operations; the Office of Green Acres and Outdoor Recreation, Bureau of Geology; the Solid Waste Administration; the Division of Environmental Quality; the Division of Parks and Forestry; the Division of Fish, Game and Shellfisheries; the Division of Water Resources; and the Division of Marine Services.

The Solid Waste Administration administers the state's solid waste program. The Division's responsibilities include development and formulation of a statewide Solid Waste Plan and the review of district plans for solid waste management including the disposal of chemical and hazardous wastes.

The Division of Environmental Quality administers New Jersey's radiation protection, pesticide control, noise control, and air pollution control programs. The Division consists of a Director's Office, an Office of Pesticide Control, an Office of Noise Control, the Bureau of Air Pollution Control and the Bureau of Radiation Protection.

The Bureau of Radiation Protection is responsible for the enforcement of rules and regulations to prohibit and prevent unnecessary radiation; registration of radiation sources; issuance of licenses for the possession and use of certain sources of radiation; monitoring of the

environment to determine compliance of major nuclear facilities with applicable rules and regulations; and maintaining an emergency response capability to ensure the safety of the public and the protection of the environment from accidents or equipment malfunctions.

The Office of Pesticide Control directs the administration, labeling, use, transportation, storage, sale, and disposal of pesticides.

The Office of Noise Control is responsible for the enforcement of rules to control community noise emanating from industrial and commercial sources.

The Bureau of Air Pollution Control maintains an air monitoring network of four comprehensive laboratories, twenty-two continuous sites and seventy-six suspended particulate samplers; issues daily air quality indices; inspects and tests industrial facilities and other sources of air pollution; develops and enforces state air pollution control regulations including prescribing abatement procedures for emergency episodes; issues compliance orders and collects penalties for violations; collects fees and issues permits to construct and certificates to operate new or altered facilities discharging contaminants; certifies tax exemptions for abatement facilities; evaluates the impact of proposed new sources on air quality; and provides assistance to municipalities for local program development. The Bureau is also responsible for establishing vehicle emission standards designed to keep cars operating cleanly and efficiently.

New Jersey's water supply, wastewater, and industrial waste programs are conducted under the authority of the Division of Water Resources. This Division consists of four elements and a director's office. The

Office of the Director coordinates, administers, and supervises activities and functions of the Water Resources Planning and Management Element, the Water Supply and Flood Plain Management Element, the Public Wastewater Facilities Element, and the Monitoring, Surveillance and Enforcement Element. This office also coordinates with the Department the water-related activities of the government agencies including the Interstate Sanitation Commission, the Delaware River Basin Commission and the United States Army Corps of Engineers.

The Water Resources Planning and Management Element is divided into two bureaus. One is the Bureau of Water Supply Planning and Management which plans long-range water supply, conducts water supply feasibility studies, provides engineering support to water supply councils, oversees watershed development, and allocates public potable water supplies.

The Bureau of Water Quality Planning and Management develops mathematical water quality models; performs water quality management planning for basins and areas; and establishes, evaluates, and monitors compliance with water quality standards.

The Water Supply and Flood Plain Management element is composed of three bureaus. The Bureau of Potable Water evalutes engineering design of water works facilities, issues permits to construct and connect, and investigates and inspects water supplies.

The Bureau of Water Facilities Operations stores, delivers and maintains water for state owned water supplies, including the Spruce Run and Round Valley Reservoirs and the Delaware and Raritan Canals.

The Bureau of Flood Plain Management administers flood plain legislation, reviews municipal applications for flood insurance, operates

flood control and erosion control programs, evaluates stream encroachment applications, and performs dam analysis.

The Public Wastewater Facilities element administers the wastewater facilities construction program, including evaluation of the planning, design, and construction of municipal wastewater facilities. The Construction Control Unit inspects construction of wastewater facilities and related environmental restoration, while the Grants Administration Unit receives formal applications and controls processing of federal and state grants for wastewater facilities. This Unit also advises municipalities on grant qualificiations and procedures.

The fourth element, the Water Pollution Control Monitoring Surveillance and Enforcement, issues permits for industrial wastewater discharges, monitors and inspects municipal and industrial treatment facilities, evaluates compliance with permit conditions, investigates water pollution complaints, and initiates enforcement actions.

The Department of Environmental Protection also has at its disposal the services of the State Health Department Analytical Laboratory in conducting its sampling and monitoring activities. In addition, the Bureau of Manpower Planning and Staff Development of the Division of Administrative Operations plans, develops and implements programs and activities designed to provide the trained personnel requested by federal, state, and municipal agencies to carry pollution control activities for which the Department has responsibility.

Pollution Control and Abatement Programs

I. AIR

A. Introduction

The air pollution control program began in New Jersey in 1954 with the enactment of the Air Pollution Control Act. This Act provided for the control and suspension of air pollution and created what is now the Clean Air Council as an advisory body within the State Department of Health. The Council consists of eight members including the Commissioners of the Department of Health, Labor and Industry and Community Affairs and the Secretary of Agriculture. Other members include eight nominees of specified organizations and six citizens representing the general public, all appointed by the Governor.

In 1970, the air pollution program, along with the Clean Air Council, was transferred from the Health Department to the newly created Department of Environmental Protection. The program is now located in the Bureau of Air Pollution Control within the Division of Environmental Quality. According to the law, the Department is authorized to:

1) formulate and promulgate regulations preventing, controlling and prohibiting air pollution;

2) formulate and promulgate regulations establishing standards and requirements for the control of air contaminants from motor vehicles, after consultation with the Director of the Division of Motor Vehicles;

3) conduct and supervise research to determine the causes, effects, and hazards of air pollution;

4) conduct and supervise state-wide air pollution education programs and distribution of information;

5) require registration of persons engaged in operations resulting in air pollution;

6) enter facilities to inspect for actual or suspected air pollution; and,

7) compromise and settle claims for penalties.

New Jersey contains all or portions of four Air Quality Control Regions (AQCR) as provided for in the State Implementation Plan. The chart on the following page lists the AQCRs and attainment status of national ambient air quality standards as of June, 1976. This was provided by the EPA State Air Implementation Plan Program Report. With respect to other portions of the SIP, two areas of the state (suburbs of New York City and Philadelphia) have promulgated transportation control plans. As of June, 1976, there were 666 major polluting installations capable of emitting over 100 tons of a pollutant each year in New Jersey. Of these, 608 were in compliance with the law, 43 were in violation, and the status of the other 15 was unknown.

B. Workforce Profile

The information for this section was obtained primarily through on-site interviews with professionals working in the air pollution program and various materials and documents provided by them.

The Bureau of Air Pollution Control has a staffing level of 175 persons at present. They are grouped into four occupational categories as indicated in the following table. The largest category is that of scientists which is composed chiefly of environmental specialists. Program officials indicate that most of the environmental specialists have degrees in biology.

The engineer category is composed of environmental engineers. The technicians are environmental and electronic technicians, which do not

Figure 1.

Attainment Status of National Ambient Air Quality Standards by Air Quality Control Region[1]

AQCR	Pollutant	TSP	SO_2	CO	O_x	NO_2
043.	New Jersey-New York-Conn. Interstate (N.J. portion)	AR	MR	AR	AR	X
045.	Metropolitan Philadelphia Interstate (N.J. portion)	AR	MR	AR	AR	
150.	New Jersey	MR		X	AR	[2]
151.	Northeast Pennsylvania-Upper Delaware Valley Interstate (N.J. portion)	MR		X	AR[2]	

[1] "X" indicates non-attainment of an applicable NAAQS, but no call for a SIP revision.

"AR" indicates non-attainment of an applicable NAAQS and a call for a SIP revision for attainment and maintenance.

"MR" indicates attainment of an applicable NAAQS, however, a SIP revision for maintenance is necessary.

A blank indicates attainment of an applicable NAAQS and no calls for SIP revisions.

[2] No or insufficient air monitoring data available. Attainment status is based on one or more of the following considerations:
(a) diffusion model
(b) emission inventory
(c) historical or incomplete data base
(d) measured air quality in adjacent AQCRs.

require a college degree. The "Other" category includes clerical, administrative and maintenance personnel.

TABLE I

NEW JERSEY DEPARTMENT OF HEALTH

Bureau of Air Pollution Control
Current (1976) Staffing Level

Position	1976
Engineer	32
Scientist	58
Technician	46
Other	39
TOTAL	175

C. Workforce Projections

Figures in this section are based upon the best professional judgements of personnel working in the air pollution control program and represent projected growth within the Bureau of Air Pollution Control.

Program officials indicate that staffing levels can be expected to increase to approximately 221 persons, a five percent increase per year over the next five years. Professionals in the program expressed a definite need for increase in workforce, especially in planning activities.

Workforce demand is expected to continue in the same job categories that are currently used. The anticipated increase will be generally across-the-board, with all categories expanding at about the same rate. The greatest opportunity will still exist for scientists (environmental

specialists). Significant opportunities for engineers and technicians are also expected to develop.

Turnover among personnel in the Bureau of Air Pollution Control is expected to be very low, as a result of past experience. For this reason, it is not indicated in Table II.

TABLE II

NEW JERSEY DEPARTMENT OF HEALTH

Bureau of Air Pollution Control
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum growth (average)
Engineer	32	34	37	39	41	43	6%
Scientist	58	62	65	68	71	74	5%
Technician	46	48	50	53	56	59	5%
Other	39	39	40	41	43	45	3%
TOTAL	175	183	192	201	211	221	5%

D. Training and Certification

Air pollution control training in New Jersey is coordinated by the Department of Environmental Protection, Bureau of Manpower Planning and Staff Development. DEP's Division of Environmental Quality has a $30,000 contract with Rutgers University for a number of short courses relating, among other things, to certification requirements for both state and local government personnel. There is also an auto mechanics training program in auto emission control technology in New Jersey.

An informal on-the-job training program is conducted for new personnel to acquaint them with state laws and regulations as well as with the operation of the Bureau. In addition, a cross-training

program is conducted by which all Bureau personnel participate in job activities other than their primary ones.

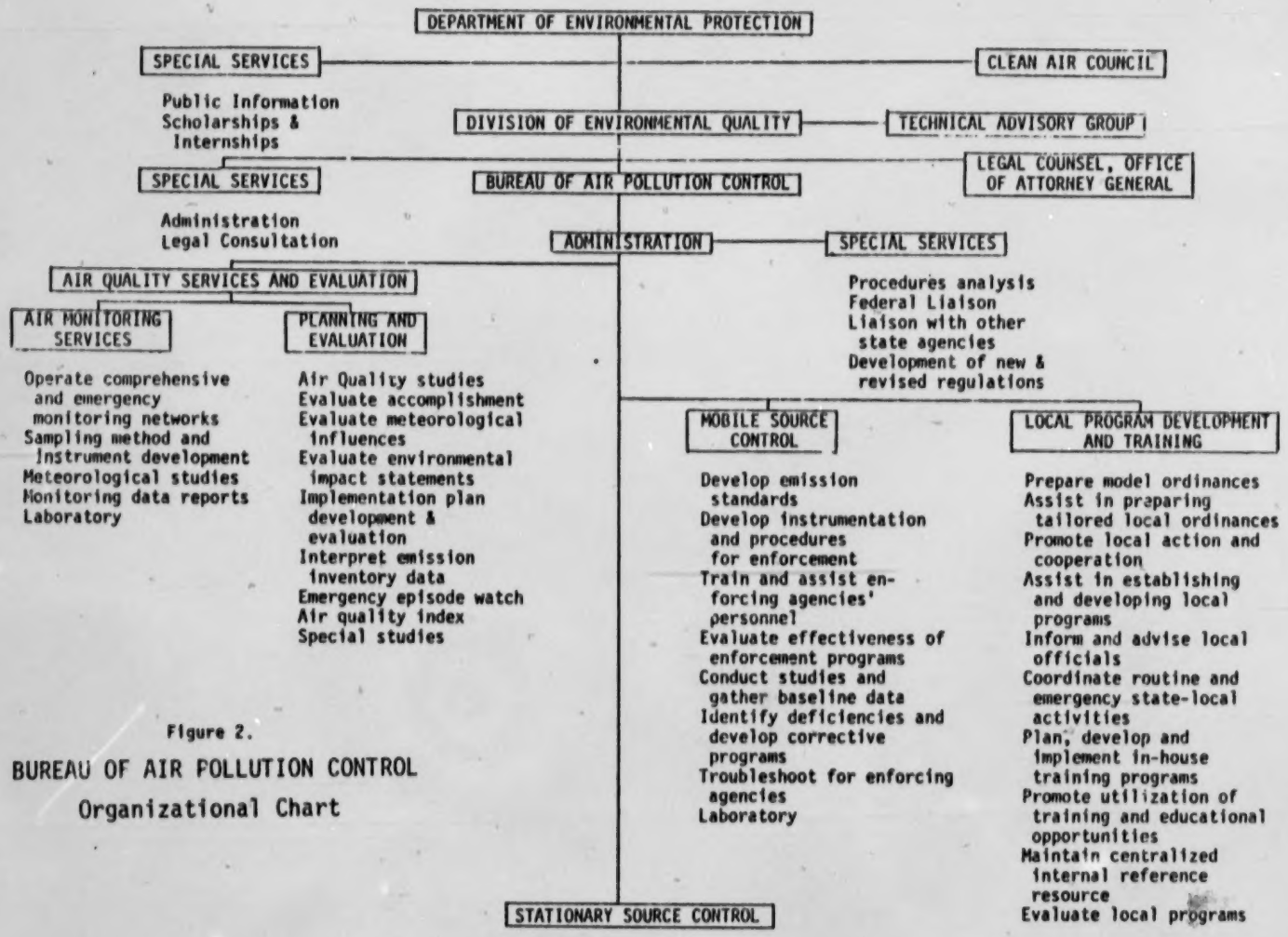
The Bureau encourages employees to take advantage of outside training activities and pays tuition costs for job-related college courses. The Bureau also participates in EPA-sponsored training as often as possible. In Fiscal Year 1976, ten persons from New Jersey attended courses offered by the EPA Air Pollution Training Institute located in Research Triangle Park, North Carolina.

E. Career Potential

The potential for future careers in air pollution control in New Jersey appears to be limited because of the small growth rate expected in the program. The potential that does exist will be in the categories of engineer, scientist, and technician, with the scientists being in the greatest demand. Job requirements are expected to remain stable as they are covered under New Jersey Civil Service regulations.

F. Conclusion

New Jersey's air pollution control program is responsible for the control and suspension of air pollution within the state. The current staffing level of 175 is comprised mainly of scientists, engineers, and technicians. Only small growth in the program is anticipated over the next five years which will be a limiting factor to career potential.



(see next page)

Figure 2.

BUREAU OF AIR POLLUTION CONTROL

Organizational Chart

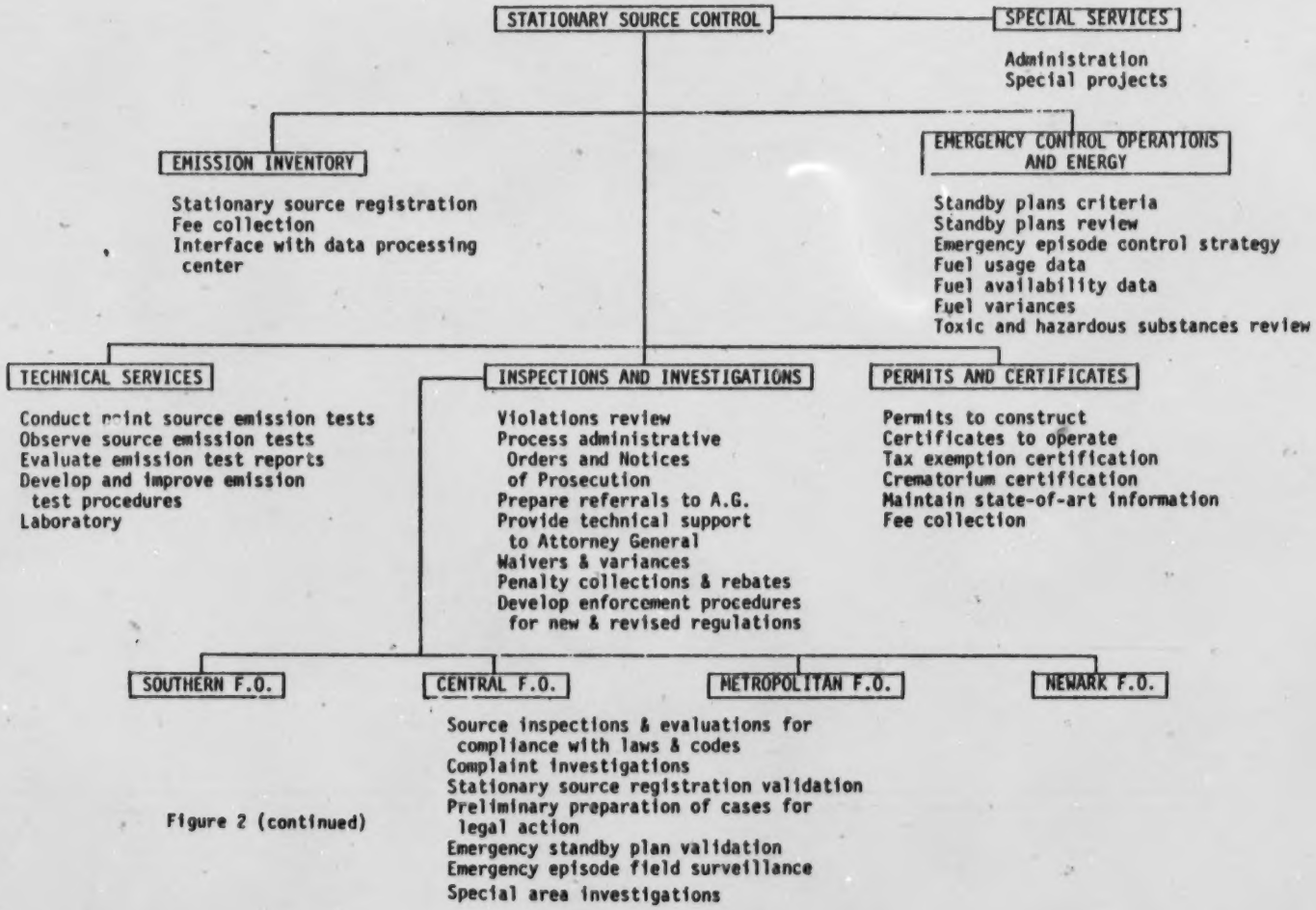


Figure 2 (continued)

II. NOISE

A. Introduction

The New Jersey Office of Noise Control is located within the Division of Environmental Quality in the state's Department of Environmental Protection (DEP). The Office is responsible for the enforcement of rules to control community noise emanating from industrial and commercial sources. DEP's authority in control covers all environmental noise problems, which includes industrial noise that extends beyond the boundaries of a particular industrial establishment. Noise within industrial facilities is covered under the federal Occupational Safety and Health Act and is regulated by the New Jersey Department of Labor and Industry.

The New Jersey Noise Control Act of 1971 authorizes the state to promulgate and enforce codes, rules, and regulations for the control and abatement of noise "of such level and duration as to be or tend to be injurious to human health or welfare, or which would unreasonably interfere with the enjoyment of life and property throughout the state or any portions thereof". The only regulations promulgated so far have been those setting standards for industrial and commercial operations, and these do not include emergency work involving public health or safety as limits for specific products of equipment.

The state Noise Control Act also specifies that ordinances and laws of local governments which are not inconsistent with the state regulations would not be superseded. It allows local governments to impose more stringent requirements if approved by DEP and allows communities to develop

noise control programs suited to local conditions. Prior to the 1971 law, twenty communities had noise ordinances. Now there are sixty-seven municipalities with some form of ordinance, as indicated in Table III.

To provide research and recommendations on noise control, the 1971 law created a Noise Control Council within DEP. This advisory body consists of thirteen members including the Commissioners of the Departments of Community Affairs, Health, and Labor and Industry, and the Director of the Division of Motor Vehicles or their representatives. There are also nine members appointed by the Governor to include a medical doctor, an industrialist, an ecologist, a civil engineer, and a member of a local governing body.

TABLE III

STATE OF NEW JERSEY

Municipal Noise Ordinance

Jurisdiction	1970 Population	Nuisance	Zoning	Vehicle	Rec/Vehicle	Railroad	Aircraft	Construction	Building
Absecon	6,094	0	-	-	-	-	-	-	-
Asbury Park	16,533	0	-	-	-	-	-	-	-
Bayonne	72,743	0	-	-	-	-	-	-	-
Belleville	34,643	X	X	-	-	-	-	-	-
Berkeley Heights	13,078	X	X	-	-	-	-	X	X
Bloomfield	52,059	0	-	-	-	X	-	-	-
Boonton	9,261	X	X	-	-	-	-	-	-
Bordentown	4,490	0	-	-	-	-	-	-	-
Brigantine	6,741	0	-	-	-	-	-	-	-
Burlington	11,991	0	-	-	-	-	-	-	-
Camden	102,551	0	-	-	-	-	-	-	-
Cape May	4,392	0	-	-	-	-	-	-	-
Cedar Grove	15,582	X	X	-	-	-	-	-	-
Clifton	82,437	X	X	-	-	-	-	-	-
Clinton	1,742	0	-	-	-	-	-	-	-
Corbin	258	0	-	-	-	-	-	-	-
Dover	15,039	0	-	-	-	-	-	-	-
East Orange	75,471	0	-	-	-	-	-	-	-
Elizabeth	112,654	0	X	-	-	-	-	-	-
Ewing	32,831	0	-	-	-	-	-	-	-
Fairlawn	37,975	0	X	-	-	-	-	-	-
Gloucester	14,707	0	X	-	-	-	-	-	-
Hackensack	36,008	0	-	-	-	-	-	-	-
Hammonton	11,464	0	X	-	-	-	-	-	-
Hanover	10,700	-	X	-	-	-	-	-	-
Harrison	11,811	0	-	-	-	-	-	-	-
Hasbrouck Heights	13,651	0	-	-	-	-	-	-	-
Hawthorne	9,173	-	X	-	-	-	-	-	-
Hightstown	5,431	0	-	-	-	-	-	-	-
Hoboken	45,380	-	X	-	-	-	-	-	-
Irvington	59,743	-	X	-	-	-	-	-	-
Jersey City	260,545	0	-	0	-	-	-	-	-
Lakewood	17,874	0	X	-	-	-	X	0	-
Linden	41,409	0	-	0	-	-	-	0	-
Long Branch	31,774	0	-	-	-	-	-	-	-
Margate	10,576	0	-	-	-	-	-	-	-
Maywood	11,087	X	-	-	-	-	-	-	-
Morristown	17,662	0	-	-	-	-	-	-	-
Newark	382,417	0	-	-	-	-	-	-	-
Newton	7,297	0	-	-	-	-	-	-	-
North Haledon	7,614	0	-	-	-	-	-	-	-
North Wildwood	3,914	0	-	-	-	-	-	-	-

Jurisdiction	1970 Population	Nuisance	Zoning	Vehicle	Rec/Vehicle	Railroad	Aircraft	Construction	Building
Nutley	31,913	0	-	-	-	-	-	-	-
Ocean City	10,575	0	-	-	-	-	-	-	-
Orange City	32,566	0	-	-	-	-	-	-	-
Passaic	55,124	0	-	-	-	-	-	-	-
Paterson	144,824	0	-	-	-	-	-	-	-
Pemberton Borough	1,576	0	-	-	-	-	-	-	-
Perth Amboy	38,798	0	-	-	-	-	-	-	-
Plainfield	46,862	0	-	-	-	-	-	-	-
Pleasantville	13,778	0	X	-	-	-	-	-	-
Princeton	12,311	X	X	-	-	-	-	-	-
Rahway	29,114	0	X	-	-	-	-	-	-
Ridgefield Park	14,453	0	-	-	-	-	-	-	-
Salem	7,648	0	-	-	-	-	-	-	-
Secaucus	13,228	0	-	-	-	-	-	-	-
South Amboy	9,338	0	X	-	-	-	-	0	-
Sparta	10,819	X	-	X	-	-	-	0	0
Summit	23,620	0	-	-	-	-	-	-	-
Trenton	104,638	0	-	-	-	-	-	-	-
Vineland	47,399	0	-	-	-	-	-	-	-
Wayne	49,141	0	-	-	-	-	-	-	-
Westfield	33,720	0	-	-	-	-	-	-	-
West Orange	43,915	X	X	X	X	-	-	-	-
Wharton	11,105	-	X	-	-	-	-	-	-
Wildwood	4,110	0	-	-	-	-	-	-	-
Woodbridge	78,846	X	-	-	-	-	-	-	-

Key: X - Regulations including acoustical criteria
0 - Regulations not including acoustical criteria
- No regulations

(Excerpted from Sound and Vibration, December, 1975, Clifford Bradgon, Contributing Editor)

B. Workforce Profile

Information concerning staffing levels for the noise control program in New Jersey was obtained primarily through on-site interviews with professionals working on the program. The profile indicated is for persons working in the Division of Environmental Quality.

Five persons are currently working on the noise control program, which has steadily increased in personnel since its inception. Initially, there was only one person employed in the program, although there were four positions authorized. In the second year of the program, the staff size increased to three. The present status of the program is unusual, however, in that the Office of Noise Control no longer exists in the state budget and, as a result, was not funded in FY 1977. The program continues to exist through the use of personnel carried in the budget of the Division of Environmental Quality. The five persons currently working in the program can be categorized occupationally as one engineer, one scientist, one technician, and two clerical employees. This is indicated in Table IV below. The engineer is an environmental engineer by training, and the scientist is an environmental scientist. These positions require four-year degrees in engineering or physics. The technician is an environmental technician and that position does not require a four-year degree. Specialized training in acoustics is not required but would be desirable according to program officials.

Local ordinances are on the books in 67 New Jersey communities. The primary function of local personnel is the enforcement of these ordinances and this is chiefly accomplished by local law enforcement

personnel. This is a part-time responsibility and there are only part-time noise control personnel in local governments in New Jersey.

TABLE IV

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Office of Noise Control
Current (1976) Staffing Level

Position	1976
Engineer	1
Scientist	1
Technician	1
Other	2
TOTAL	5

C. Workforce Projections

Program officials indicate that there is a need for a substantial increase in the number of persons in noise control over the next five years. Professionals believe that the program will receive an emphasis from both state and federal governments in the next few years. As indicated in Table V it is anticipated that the program will increase by eighteen persons, from five to twenty-three. The areas of greatest projected need will be for engineers and technicians. Program officials indicate that the persons desired for these positions will likely be environmental engineers and environmental technicians and will be engaged primarily in enforcement activities. There will also be a need for environmental specialists, classified as scientists in the table, principally for research activities. An increase in clerical personnel will be necessary to support the increased program size.

TABLE V

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Office of Noise Control
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	1	1	3	4	5	7	N/A	60%
Scientist	1	1	3	3	3	3	N/A	40%
Technician	1	1	3	5	6	8	N/A	42%
Other	2	2	3	4	5	5	N/A	22%
TOTAL	5	5	12	16	19	23		38%

Several activities are planned for the Office of Noise Control over the next five years. These are listed below as indicated in planning documents provided by program officials.

FY 1978: Emphasis for this fiscal year is to create a permits and certificate capability which will provide revenue and to recreate the research capability necessary to gather a data base for future regulations. A modest increase in enforcement staff will reduce the present back-log of complaints.

FY 1979: The elements created in Fiscal Year 1978 are projected to be strengthened by increasing of staff from 12 to 16. Promulgation of construction code and auto racetrack are highlights of the Fiscal Year.

FY 1980: An increase in enforcement staff will allow enforcement of codes that were promulgated in late Fiscal Year 1979.

FY 1981: Emphasis for this Fiscal Year is the creation of a section in Permits and Certificates that will allow better review of EIS and preparation background for the promulgation of future codes. Additional staff in enforcement is required for the new code.

FY 1982: The enforcement element will be strengthened by creating a section that will address mobile sources. The research element will be strengthened by expanded use of the mobile van for surveys et al.

D. Training and Certification

State program personnel are provided with informal on-the-job training to acquaint them with the New Jersey Noise Control Act and the regulations promulgated under it. It is provided informally, because of the small number of people in the program and the fact that there is almost no turnover.

A formal noise control course has been established by the Office of Noise Control and provided to local health department officials and municipal officials. The course, Basics of Noise Control, was presented four times by Rutgers under a contract with the Bureau of Manpower Planning and Staff Development (BMPSD) utilizing federal funds. The program has been in operation for one and a half years and 153 local officials have been trained. Program professionals estimate that these 153 persons are less than one fourth of all that need to be trained. It is not anticipated that any additional funding will be available, and the course is no longer offered.

E. Career Potential

Despite the anticipated large increase in personnel, there appears to be few new careers developing. The persons hired in the next five years will primarily be engineers, technicians, and scientists. The Office of Noise Control has traditionally relied on environmental engineers, specialists and technicians in the performance of their activities, and this is expected to continue. Therefore, the greatest potential lies within these backgrounds.

F. Conclusion

The noise control program is currently operating in New Jersey without a budget. The workforce is provided by the Division of Environmental Quality and is few in number. Program professionals anticipate a sizeable increase in personnel over the next five years and have an ambitious program of objectives which they hope to accomplish. Environmental engineers, environmental scientists, and technicians are utilized in the program, and it is anticipated that persons with these backgrounds will continue to be utilized in future years.

III. PESTICIDES

A. Introduction

New Jersey's pesticide program is the responsibility of the Office of Pesticide Control in the Division of Environmental Quality of the Department of Environmental Protection (DEP). The Office controls the administration, labeling, use, transportation, storage, sale, and disposal of pesticides and pesticide products.

The New Jersey Pesticide Control Act of 1971 makes it unlawful to sell, purchase, transport, label, use, or apply pesticides which may cause adverse health or environmental effects, or to remove, dispose, or use embargoed pesticides without permission of DEP. The Act also created within DEP a Pesticide Control Council, consisting of nine members including the Secretary of Agriculture Commissioner of Health; the Dean of the College of Agriculture and Environmental Science at Rutgers, the State University; and six members of the general public to include a farmer, a toxicologist, and an ecologist. The Commission acts as an advisory body to DEP in matters relating to the control, regulation, and use of pesticides and has the following authorities:

1) Request from the Commissioner such information concerning pesticides as it may deem necessary;

2) Study and consider any matter relating to the improvement of pesticide control programs and advise the commissioner thereon;

3) From time to time submit to the Commissioner such recommendations and reports which it deems necessary for the proper conduct and improvement of pesticide control programs;

4) Study the use, application and disposal of pesticides and advise the commissioner thereon;

5) Study pesticide control programs and make reports and recommendations thereon to the commissioner as it may deem necessary;

6) Study any regulations promulgated by the Department or any other governmental entity in regard to the control of pesticides and make such recommendations thereon to the commissioner as it may deem appropriate;

7) Study and investigate the state of the art and the technical capabilities and limitations of regulations concerning use and control of pesticides and their relation to the environment and ecology and report its findings and recommendations thereon to the Commissioner;

8) Study and investigate the state of the art and the technical capabilities and limitations of regulations concerning use and control of pesticides and their relation to the environment and ecology and report its finding and recommendations thereon to the Commissioner; and,

9) Hold periodic public hearings concerning the use and application of pesticides and upon the state of the art and technical capabilities and limitations in pesticide control and report its recommendations thereon to the Commissioner..."

Although the 1971 law did not provide for the certification of commercial and private applicators, it has since been amended to bring it into compliance with the federally mandated requirements of (FIFRA). The State has established eleven categories of commercial applicators including:

1. Agricultural Pest Control
2. Forest Pest Control
3. Ornamental and Turf Pest Control
4. Seed Treatment
5. Aquaitic Pest Control
6. Right-of-Way Pest Control
7. Industrial, Institutional, Structural and Health Related Pest Control
8. Public Health Pest Control
9. Regulatory Pest Control
10. Demonstration and Research Pest Control
11. Aerial Pest Control

and six categories of private applicators to include:

1. Field and Forage
2. Fruit
3. Vegetable
4. Greenhouse and Florist
5. Nursery, Ornamental and Turf
6. Livestock and Poultry

B. Workforce Profile

Information for this section was provided primarily through on-site interviews with professionals working in the pesticide program and the use of materials and documents supplied by them.

The current staffing level of the State's pesticide program consists of ten people who are categorized into three occupational groups as illustrated in Table VI. The three persons classified as scientists are involved in administrative and enforcement activities of the program. Although professionals working in the program indicated that persons with scientific backgrounds are preferred for these positions, especially degrees in environmental science, biology, or chemistry, persons with other backgrounds and training could potentially be utilized. Those listed as technicians in the table have as their primary duty field inspection activities. These positions do not require college degrees, and persons normally hired have high school educations and possibly some college work. The two laboratory technicians provide analytical support to the program. As with the other technicians, these positions do not require a college degree although some college work is considered helpful.

In addition to the Department of Environmental Protection, the State Department of Health is involved in the pesticides control program. The Health Department's function consists of providing laboratory support to DEP since budget constraints and questions of duplication of existing facilities prevent DEP from establishing all of its laboratory activities in-house. The pesticide activities are located in the Chemistry Program under the Office of the Assistant Commissioner of Health. Two persons are currently working on pesticides in the Health Department and include a chemist and a laboratory technician. The chemist is a professional, requiring a four-year degree in chemistry, while the technician position is normally filled by a person with a high school education combined with work experience or some college training.

In addition to state program personnel, professionals estimate that there are 5,000 commercial applicators and 15,000 private applicators in the state that must be certified under the law. Thousands of others, primarily farmers, are pesticide applicators but do not require certification.

TABLE VI

NEW JERSEY DEPARTMENT OF HEALTH
and DEPARTMENT OF ENVIRONMENTAL PROTECTION

Pesticide Programs
Current (1976) Staffing Level

POSITION	1976
Scientist	3
Technician	5
Lab Technician	2
TOTAL	10

C. Workforce Projections

Program officials in the Office of Pesticide Control have indicated that an immediate need for five additional people exists. Approval for the addition of these positions has been given by the state, and it is anticipated that persons will be hired for them in 1977. As Table VII indicates, there will be increases in all categories as a result of the new positions. Qualifications for each category and job duties are expected to be the same as for current positions as described in the workforce profile section. After the initial increase of five persons, program professionals anticipate that the workforce level will stabilize and show only a slight increase through 1981. Projections for Health Department personnel are not available but, since this Department provides laboratory support services to the DEP activities, officials in the Health Department estimate that their workforce is dependent on the size and scope of DEP's future pesticide activities.

TABLE VII

NEW JERSEY DEPARTMENT OF HEALTH
and
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Pesticide Programs
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Scientist	3	5	6	6	7	7	N/A	21%
Technician	5	7	7	8	8	9	N/A	13%
Lab Tech.	2	3	3	3	3	3	N/A	10%
TOTAL	10	15	16	17	18	19		15%

D. Training and Certification

The New Jersey Cooperative Extension Service has the overall responsibility for the state's pesticide applicator certification training program. Training is offered in each county and conducted by agents of the Extension Service. In the case of commercial applicator training, extension service training may be supplemented by outside specialists, trade and professional associations, and community colleges. The basic material used for training both private and commercial applicators is the Pesticide Applicator Core Training Manual of the Northwestern Regional Pesticide Coordinators, prepared by Cornell University. As of January 1, 1977, officials indicated that 1,163 commercial and 7,331 private applicators had been trained and that there remained 3,800 commercial and 1,700 private applicators to be trained. In addition to the regular applicator training program, an application was submitted by the Bureau of Manpower Planning and Staff Development (BMPSD) to CETA for funding to contract Rutgers to conduct a certification training program for functionally illiterate pesticide applicators but the grant was not awarded.

Although training prior to certification and recertification is not mandatory, the Office of Pesticide Control strongly encourages applicators to take it. Commercial applicators must be recertified every five years and to be recertified must take a total of three approved training courses during that time or take a recertification examination. Similar requirements apply to private applicators except that the time frame is six years instead of five.

The Office of Pesticide Control has no formal on-the-job training program but provides informal orientation to new personnel on the state pesticides law and regulations and the operation of the Office. Personnel are sent to EPA sponsored training as often as possible and they also take the basic applicator training course.

E. Career Potential

Only a limited potential is anticipated for careers in pesticides at the state level. Although percentage increases in the program appear to be significant, the small number of people involved limit the actual number of jobs available. Potential will exist for those persons with a four-year degree in one of the natural sciences such as agricultural science or chemistry and for technicians, primarily in the field inspection activities.

Career opportunities for commercial applicators are difficult to predict since no projections of workforce growth in this area are available. Since this appears to be the area with greatest personnel turnover, it can be assumed that the greatest career potential exists here. Other career possibilities may be available in the fields of integrated pest management and pesticide disposal, but figures are generally not available to provide information on the types of jobs or numbers of people that might be required. An exception is a U.S. Department of Agriculture study done in 1972 which indicated that the potential workforce requirements for integrated pest management to be more than 280 persons in New Jersey. Most of these persons would be field scouts, a position requiring a high school education and some knowledge of entomology. The remaining

persons would be professional crop protection specialists with backgrounds in the physical sciences. The Agriculture Department based its figures on one field scout per 2,000 acres of cropland and one crop protection specialist per 30,000 acres.

F. Conclusion

The pesticide program in New Jersey began in 1971 and has been revised since that time to conform with the federal requirements under FIFRA. The state program employs a total of twelve people within the Departments of Environmental Protection and Health and their responsibilities include the labeling, use, transportation, storage, sale, and disposal of pesticides. It is anticipated that only small increases in the number of state personnel will occur over the next five years, resulting in limited career opportunities.

IV. POTABLE WATER

A. Introduction

The Bureau of Potable Water, which is part of the Division of Water Resources in the Department of Environmental Protection (DEP), has the responsibility for the water supply program in New Jersey. The program was transferred from the State Health Department to the Department of Environmental Protection in 1970 and has total responsibility for the state drinking water supply. The state laws which govern this program are not in compliance with the federal Safe Drinking Water Act (SDWA). To rectify this, the Department has entered into an agreement with Rutgers University to review existing laws and determine the revisions necessary to ensure compatibility with the federal law.

The program objectives are to assure safe drinking water and adequate water supply systems to meet consumer needs. Primary effort is directed toward ensuring that water of the highest quality is delivered and that adequate prime source, pumpage, storage, transmission and distribution facilities are provided to maintain sufficient volume and pressure. However, increasing population density, careless use and disposal of toxic chemicals/waste make this increasingly difficult to achieve.

SDWA (P.L. 93-523) which became law in December, 1974, provides for safety maintenance of drinking water supplies through the establishment and enforcement of national drinking water regulations. All states are encouraged to assume primacy for the enforcement of these regulations and for the supervision of public water supplies.

New Jersey has undertaken to assume all aspects of primary enforcement responsibility in accordance with SDWA and the federal regulations promulgated thereunder. The state currently regulates approximately 560 'community' public water systems. It is attempting to establish and/or comply with all of the requirements for primacy as specified in the federal legislation, providing federal funding and the ability to hire and train additional personnel is available.

At this time, New Jersey cannot undertake the necessary supervision of the additional community and non-community public water systems (an estimated 8,000 to 10,000), as federally defined because of staffing problems. These supplies serve less than 10 percent of New Jersey's population. The extension of such supervision to these additional systems can be accomplished only if substantial federal funding is available.

B. Workforce Profile

Data for this section was compiled through on-site interviews with professionals in the field and by the use of various materials and documents provided by them.

A brief delineation of activities performed by the Bureau of Potable Water, according to the Program Plan for Fiscal Year 1977, follows:

1) Emergency Plans: The development of a plan for the provision of safe drinking water under emergency circumstances. Such a plan will be developed during FY-77 in accordance with federal guidelines which is currently in the course of preparation.

2) Inspections: Conducting annual sanitary surveys of the community water supplies currently regulated, with the forwarding of written reports to appropriate water pruveyors, and other interested agencies. Appropriate follow-up will be made routinely.

3) Monitoring: Sampling and testing the delivered bacteriological quality of the water from each community water supply system under state jurisdiction on a quarterly basis. This includes samples taken in virtually every municipality served by the major water purveyors which serve more than one municipality, and samples from every water supply system that is within a single municipality.

4) Reporting by Water Purveyors: Analytical data is not yet routinely submitted by all public water systems which are under state jurisdiction, except for microbiological data which is included in monthly operators' reports. As the requirements of the federal National Interim Primary Drinking Water Regulations will not be effective until June 1977, the majority of small water purveyors have not yet implemented an appropriate sampling program consistent with those regulations. However, endeavors will be made to secure appropriate compliance.

5) Enforcement: Procedures for administrative and judicial enforcement of water supply statutes and regulations include informal notice via inspection reports to correct deficiencies, followed by appropriate correspondence and, if necessary, formal orders.

6) Disease Surveillance and Investigation: The investigation of diseases suspected to be of waterborne origin. Emphasis is currently placed on microbiological diseases, but the program will be strengthened to include diseases associated with chemical contaminants. As needed, the Bureau of Potable Water cooperates in investigations of suspected cases of groundwater contamination resulting from the careless handling and disposal of chemical compounds.

7) Complaint Investigation: The investigation of citizens' complaints relative to the adequacy and quality of water delivered by the community water supply systems under the jurisdiction of the Bureau, and for the institution of remedial action.

8) Plan Review: The Bureau conducts a comprehensive program for the review and approval of plans and specifications for construction projects for the community water supplies presently regulated by the state in accordance with Rules and Regulations for the Approval of Public Water Supply Systems and Water Treatment Plants which prescribe minimum standards of design and construction. Approximately 120 water projects are examined each year, but this number is expected to increase as a result of stepped-up inspection and enforcement activities and efforts by the water purveyors.

9) Physical Connection Permits: The Bureau conducts a permitting program for physical connections between approved public water supply systems and unapproved supplies.

The current staffing level for the Bureau of Potable Water consists of seventeen persons. As illustrated in the table below, seven are engineers. These positions require a degree in the engineering sciences and they are normally filled by persons with chemical or sanitary engineering backgrounds. The Bureau also has one sanitarian on its staff. This is a professional position requiring a four-year degree in a public health or related scientific area. There are also five technicians who are not required to have a college degree, and four persons classified in the "Other" category who are clerical employees.

TABLE VIII

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Water Resources
Bureau of Potable Water
Current (1976) Staffing Level

Position	1976
Engineer	7
Sanitarian	1
Technician	5
Other	4
TOTAL	17

In addition to the Bureau of Potable Water, the Health Department is also involved in the water supply program. The New Jersey Department of Environmental Protection contracts with the New Jersey Department of Health for needed laboratory services for the microbiological and chemical testing of water samples collected by Division of Water Resources personnel. Both the microbiological and chemical laboratories have been certified by EPA. They have adequate capability and personnel to meet the analytical requirements resulting from routine sampling during FY-77 but will probably need additional personnel and equipment to accommodate a stepped-up program in future years.

The current staffing level for the Health Department is a total of fourteen persons in three occupational categories as shown in the following table. Half of the employees are professional, with six being chemists and one a biologist. Job requirements are the same as those for DEP - a four-year degree in the natural or physical sciences (see Section VII. WASTEWATER for further specifications). The seven laboratory technician positions do not require a college degree.

TABLE IX

NEW JERSEY DEPARTMENT OF HEALTH

Potable Water Programs
Current (1976) Staffing Level

Position	1976
Chemist	6
Biologist	1
Lab Technician	7
TOTAL	14

Three classifications of water supply and water treatment plant operators exist in New Jersey as provided for in regulations of the DEP. The classifications for water supply are W-1, W-2, and W-3. The classifications for water treatment are T-1, T-2, and T-3. A description of these classifications follows:

1) W-1: All water supply systems designed to deliver or delivering more than approximately 1,000,000 gallons per day.

2) W-2: All water supply systems designed to deliver or delivering less than approximately 1,000,000 gallons per day but serving approximately 50 or more dwelling units or properties.

3) W-3: All water supplies designed to deliver or delivering water to less than approximately 50 dwelling units or properties.

4) T-1: All surface water treatment plants and those plants employing sedimentation and/or coagulation, filtration, disinfection and other processes such as defined in T-2.

5) T-2: All water treatment plants employing iron and/or manganese removal, flouridation, chemical stabilization, pH adjustment, softening, and disinfection.

6) T-3: All water treatment plants employing disinfection only.

C. Workforce Projections

Information for this section was obtained through on-site interviews with professionals working in the potable water program and represents the best professional judgements of those persons.

Personnel within the Bureau of Potable Water is projected to increase at a rate of approximately 16 percent per year over the next five years. This represents a doubling of the current staff, which is considered

necessary to adequately administer the program and meet responsibilities under the Safe Drinking Water Act. As shown in the following table, the largest category in terms of personnel will be engineers, although all categories are expected to approximately double their current numbers. Program officials do not anticipate any changes in the current educational requirements for those positions in the future.

TABLE X

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Water Resources
Bureau of Potable Water
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum growth (average)
Engineer	7	12	12	13	13	14	17%
Sanitarian	1	2	2	2	3	3	30%
Technician	5	8	8	8	8	9	15%
Other	4	8	8	8	8	8	20%
TOTAL	17	30	30	31	32	34	6%

The Health Department estimates that an increase of five persons will be needed by 1981 in laboratory support activities of the Division of Water Resources water programs. This represents an overall increase of 7 percent in the staffing strength as illustrated in the following table. Program officials expect to see increases in the number of chemists and lab technicians but not in biologists.

TABLE XI

NEW JERSEY DEPARTMENT OF HEALTH

Potable Water Programs
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum growth (average)
Chemist	6	6	7	7	8	8	6%
Biologist	1	1	1	1	1	1	n/a
Lab Technician	7	7	8	9	9	10	7%
TOTAL	14	14	16	17	18	19	6%

D. Training and Certification

The Department of Environmental Protection is responsible for water supply personnel training to include personnel of Bureau of Potable Water and water supply/treatment plant personnel. The Department's Bureau of Manpower Planning and Staff Development coordinates this activity. Training which is necessary to meet licensing requirements is provided by the community college systems and augmented by short courses and seminars sponsored by DEP and U.S. EPA.

Basic policy for operator training is set by the Advisory Council on Water and Wastewater Operator Training in which DEP is represented along with schools offering operator training courses and organizations involved in water pollution control. This Council establishes the curricula for operator training courses offered throughout the state by vocational/technical schools and community colleges. Training includes introductory and advanced water operations and laboratory analyses. (Refer to Section VII - WASTEWATER for listing of courses offered and the schools that offer them.)

EPA's Office of Water Supply has developed a comprehensive program of training activities designed to support the implementation of SDWA.

New Jersey has had a program for the licensing of superintendents or operators of public water supply systems and public water treatment plants since 1919. Criteria for admission to the licensing examinations include academic qualifications, practical experience and successful completion of basic and advanced courses.

E. Career Potential

Career potential in the potable water program in New Jersey is somewhat limited. The program is expected to double in staffing requirements in order to comply with provisions of the Safe Drinking Water Act; however, once this is completed, the staffing level is expected to remain constant. The program's current staffing level is small and the anticipated increase will actually produce few new positions.

Potential is greatest for those persons with degrees in the engineering sciences such as chemical or sanitary engineering. The other occupation which holds the greatest potential is that of environmental or laboratory technician which does not require a four-year degree.

F. Conclusion

New Jersey's potable water program is administered by the Department of Environmental Protection with laboratory services provided by the Department of Health. The program is staffed by seventeen persons, with an almost equal number of engineers and technicians. Program officials see the need for a doubling of staff size to implement federal requirements.

A comprehensive training program is available to both program personnel and treatment plant operators through the DEP's Office of Manpower Planning and Staff Development and outside organizations. This is expected to grow as the size of the program increases.

V. RADIATION

A. Introduction

New Jersey's radiation activities come under the jurisdiction of the Bureau of Radiation Protection located within the Department of Environmental Protection (DEP). The program originated in the Health Department as the Radiological Health Program and was transferred to DEP with its creation and has responsibility for public radiological health and safety.

As described in documents provided by Bureau personnel, "the following points basically govern the activities of this Bureau":

1. Establishment of an autonomous, rule-making body within DEP, the New Jersey Commission on Radiation Protection which the Bureau is required to support by statute and which has audit authority with respect to the Bureau;

2. Bureau authority extends to ionizing and nonionizing radiation;

3. Prevention of unnecessary radiation exposure to ionizing and nonionizing radiation;

4. Management of radiation accidents;

5. Pre-emption of authority for radiation protection from local governments;

6. Authority to enter into an Agreement State Contract with the U.S. Nuclear Regulatory Commission at the discretion of the Governor;

7. Registration of all sources of ionizing radiation within the state;

8. Inspection of radiation sources;

9. License users of certain types of radiation sources;

10. Engage in educational activities and research related to radiation protection;

11. Review plans and specifications;

12. Survey and engage in protection work related to nonionizing radiation;

13. Support the X-ray Techinician Board; and

14. Audit the environmental and food chain to ensure release of radioactive materials from nuclear reactors and nuclear facilities meets facility technical specification and to determine if biological reconcentration is occurring in the food chain.

The Radiation Protection Act, enacted in 1958, is the basis for the New Jersey radiation program. The law created a Commission on Radiation Protection, consisting of eight members, to include the Commissioners of the Departments of Environmental Protection, Labor and Industry, and Health, and five members appointed by the Governor. The Commission promulgated the New Jersey Radiation Protection Code, last amended in 1969, which is currently under revision. This comprehensive code is enforced by the Bureau of Radiation Protection, which is divided into five operational units, as indicated on the organizational chart at the end of this section. Their activities include:

A. Machine Source Program

1. All X-ray machines are registered and inspected and compliance with the Code enforced.

2. A registry of X-ray equpment is maintained.

B. Radioactive Materials Program

1. All installations using greater than exempt quantities of radioactive materials are required to conform to the applicable provisions of the New Jersey Radiation Protection Code. Inspections are conducted to assure compliance with the Code.

2. All users of radioactive materials not licensed by the U.S. Atomic Energy Commission are licensed by the Department through the Bureau of Radiation Protection. Materials requiring a New Jersey license include radium and accelerator-produced radioisotopes.
3. Records on New Jersey and Atomic Energy Commission licensees are maintained.

C. Nuclear Facilities Engineering Section

1. All existing or proposed major nuclear facilities are evaluated with respect to impact on their environment. This includes an examination of micrometeorological factors and facilities for limiting the discharge of radioactive contaminants to air or water and the methods of disposal of solid wastes.
2. The design of systems to monitor economically the impact of major nuclear facilities on the environment and the examination of data generated from the operation of such monitoring systems.
3. Provides, as required, nuclear engineering assistance to other branches of State Government.

D. Radiation Protection Laboratory Section

1. Provides analytical and sample collection services in support of monitoring systems to determine the impact, if any, on the environment.
2. Provides analytical and sample collection services in support of activities designed to determine background (or naturally

occurring) radioactivity levels in water, foodstuffs and other environmental media throughout the State. The radioactivity detected would include fallout from nuclear weapons testing.

3. Provides analytical services in support of activities conducted to determine compliance with the Code by all users of radioactive materials.
4. Conducts research and development activities as indicated.

E. Supporting Services Section

1. Statistical Services

   Provides statistical analytical services in support of all Bureau of Radiation Protection activities.

2. Educational Services

   Provides instruction for firemen, policemen, first aid squad members and others as to the relative hazard from ionizing radiation encountered by these emergency workers in the conduct of their business so as to allay unwarranted fear.

   Provides in-service training for all practicing X-ray technicians on the principles and practice of radiation protection.

New Jersey has ten nuclear power plants in operation, under construction, under review for permit, or announced. The following table indicates the location, capacity, status, and operational date of the facilities. This table was excerpted from the Nuclear Regulatory Commission Annual Report, 1975 and verified with Significant U.S. Power Plants in Planning or Construction, July 1, 1976, Presidential Task Force on Power Plant Acceleration, Federal Energy Administration.

TABLE XII

State of New Jersey
Nuclear Power Facilities

Site	Plant Name	Capacity (Net M We)	Type	Status	Utility	Scheduled Operation
Toms River	Oyster Creek Nuclear Power Plant: Unit 1	640	BWR	OL	Jersey Central Power & Light Co.	1969
Forked River	Forked River Generating Station: Unit 1	1,070	PWR	CP	Jersey Central Power & Light Co.	1982
Salem	Salem Nuclear Generating Station: Unit 1	1,090	PWR	CP	Public Service Elec. & Gas Co.	1976
Salem	Salem Nuclear Generating Station: Unit 2	1,115	PWR	CP	Public Service Elec. & Gas Co.	1979
Salem	Hope Creek Generating Station: Unit 1	1,067	BWR	CP	Public Service Elec. & Gas Co.	1982
Salem	Hope Creek Generating Station: Unit 2	1,067	BWR	CP	Public Service Elec. & Gas Co.	1984
Little Egg Inlet	Atlantic Generating Station: Unit 1	1,150	PWR	UR	Public Service Elec. & Gas Co.	1985
Little Egg Inlet	Atlantic Generating Station: Unit 2	1,150	PWR	UR	Public Service Elec. & Gas Co.	1987
*	Atlantic Generating Station: Unit 3	1,150	PWR	A/O	Public Service Elec. & Gas Co.	1990
*	Atlantic Generating Station: Unit 4	1,150	PWR	A/O	Public Service Elec. & Gas Co.	1992

Key: OL - Operating License
CP - Construction Permit Issued
UR - Under Review for Permit
A/O - Announced/Ordered

B. Workforce Profile

The information for this section was compiled primarily through on-site interviews with professionals working on the program and with materials supplied by them. The figures in this section apply to personnel of the Bureau of Radiation Protection.

The current staffing level of the Bureau consists of 41 people. This indicated considerable growth in the program since its inception. There were a total of six people working in radiation activities when the program was started, and it grew to 21 persons by 1970.

The program is composed primarily of scientists as indicated in Table XIII. Most of the scientists employed in the program are radiation physicists. The remainder are radiation chemists, research scientists, radiation specialists, and an environmental specialist. All these personnel have four year degrees, and most have specialized training in radiation. The program also includes a nuclear engineer; six technicians, who are radiation or X-ray technicians; and ten classified as "other", which is composed of clerical personnel.

Private sector staffing in New Jersey includes privately employed X-ray technicians, personnel at nuclear power facilities, and persons having part-time responsibilities in local radiation programs. Local governments are forbidden by law in New Jersey from having full-time radiation employees. Staffing requirements for nuclear power plants currently operating in the state were not available, and information on X-ray technicians was not obtained since these are not considered to be environmental control positions.

TABLE XIII

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Radiation Protection
Current (1976) Staffing Level

POSITION	1976
Engineer	1
Scientist	
Radiation Physicist	14
Radiation Chemist	4
Research Scientist	3
Environmental Specialist	1
Radiation Specialist	2
Technician	6
Other	10
TOTAL	41

C. Workforce Projections

Program personnel have indicated that a moderate increase in personnel is anticipated over the next five years. Staffing projections for the Bureau of Radiation Protection through 1981 are indicated in Table XIV. These projections are based on the best professional judgements of program personnel.

The total number of increased personnel would be twelve, with eight of these being scientists. Although it is not definite as to what types of scientist would be employed, past experience indicates that they will probably be physicists or chemists with training in radiation activities. The remaining four positions are expected to be clerical support positions.

Projected workforce levels in the private sector cannot be estimated since much of it depends on staffing levels at nuclear power facilities.

It is estimated, however, that two additional nuclear facilities will be operating in New Jersey by 1981.

TABLE XIV

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Radiation Protection
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	% annum ave. turnover	% annum ave. growth/decline
Engineer	1	1	1	1	1	1	N/A	N/A
Scientist	24	27	32	32	32	32	N/A	6%
Technician	6	6	6	6	6	6	N/A	N/A
Other	10	11	13	13	13	14	N/A	8%
TOTAL	41	45	52	52	52	53	N/A	5%

D. Training and Certification

The Bureau of Radiation Protection is involved in several types of training activities. An informal on-the-job training program is provided to new personnel in the Bureau to familiarize them with the state law, the radiation protection code, and the activities of the Bureau. In addition, professional personnel are sent to a formal radiation protection course at Oak Ridge, Tennessee, which is provided under a contract between the Bureau and the Nuclear Regulatory Commission.

The Bureau also provides training to local communities. Unlike most environmental programs in New Jersey, training is not conducted by Rutgers University under a contract with the Bureau but provided directly by Bureau personnel. Training is provided to local police, fire, and rescue units and other related groups that would be able to assist the Bureau in the control and management of a radiation emergency situation.

Program officials indicate that approximately 2,000 to 3,000 people are trained each year under this program.

Program personnel also indicated that a formal training program is expected to be initiated in the next year to train nuclear medicine technicians. Currently there are about 2,000 to 3,000 such technicians in the state who are allowed to dispense nuclear related drugs to patients. There are presently no radiation training requirements for these technicians. The training courses will be conducted by the Bureau along with the New Jersey College of Medicine and Dentistry.

E. Career Potential

Opportunities for careers in radiation protection appear promising with the addition of several nuclear facilities, two of which are expected to be operating by 1981. At the state program level, the greatest potential is for those persons with scientific backgrounds such as physics or chemistry and some training in radiation. Most of the opportunity will be for professional persons with only limited potential for persons without four-year degrees.

F. Conclusion

New Jersey has had a radiation protection program in operation for almost twenty years to ensure protection of the public health and safety. The state program has a rather large workforce, over 40 people, most of whom are professionals with scientific backgrounds and additional training in radiation. It is anticipated that these backgrounds will continue to be sought in future years. Most of the private employment

in radiation protection exists at nuclear power facilities and at medical facilities with the use of X-ray equipment. The field of environmental radiation can be expected to grow with the completion of several nuclear power facilities in the state.

BUREAU OF RADIATION PROTECTION
1977-78

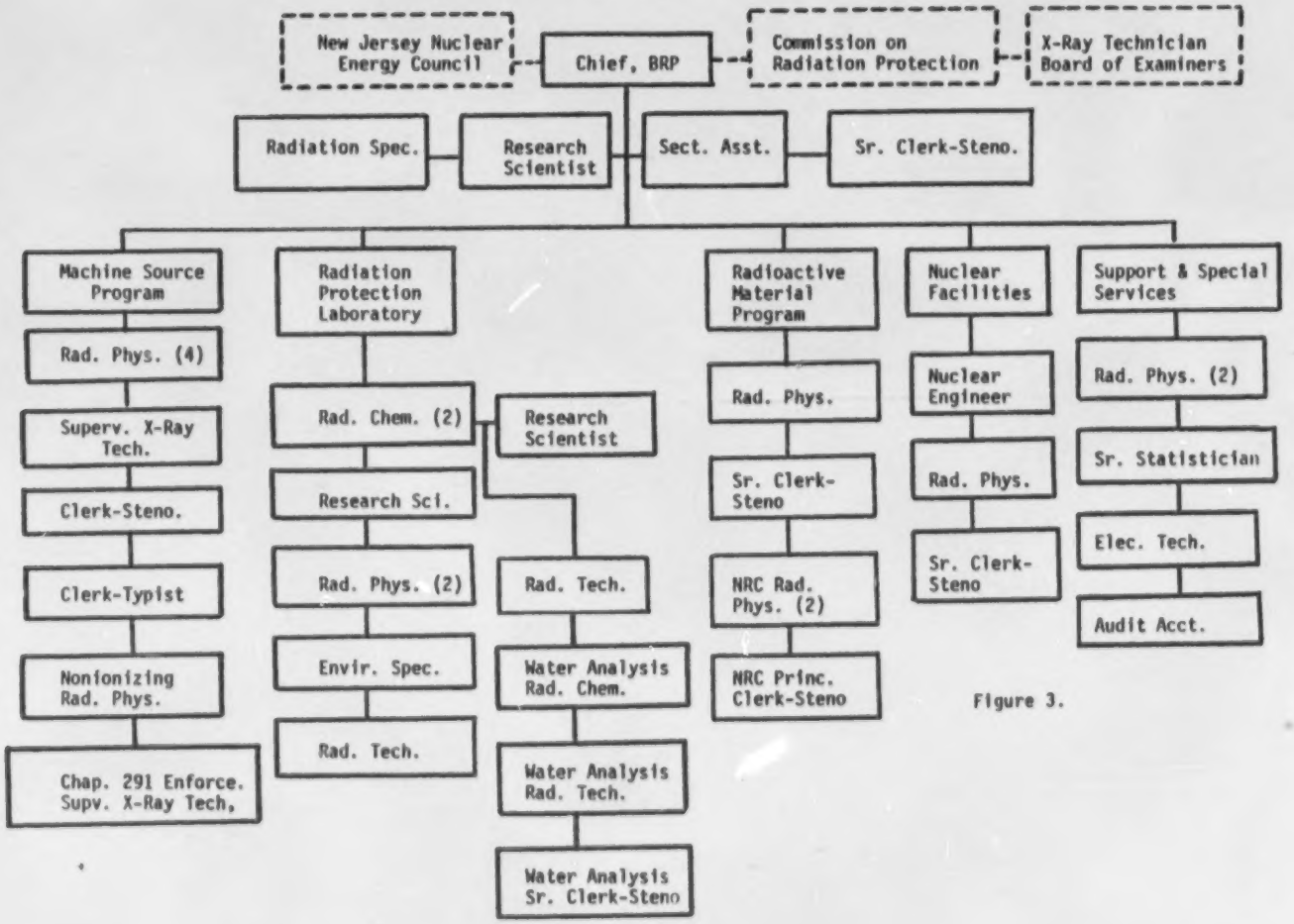


Figure 3.

VI. SOLID WASTE

A. Introduction

The New Jersey Solid Waste Management Act of 1970 gave authority to the Department of Environmental Protection (DEP) for the registration and evaluation of all solid waste facilities within the state. These functions were handled within the Department by the Division of Solid Waste Management which is now the Solid Waste Administration (SWA), in 1976. Responsibilities of the Division include the development and formulation of statewide, regional, county, and intercounty plans for solid waste management including the disposal of chemical and hazardous wastes. Other duties include registration of solid waste collection and disposal facilities/operations; determination of the most efficient, sanitary, and economic methods of collections, disposal and utilization of solid waste (including resource recovery programs); and promulgation and enforcement of regulations concerning solid waste collection and disposal activities.

It is estimated that fifteen million tons of garbage and forty to sixty million gallons of liquid waste are disposed of each year in New Jersey. The primary disposal method for solid waste is burial in sanitary landfills. Disposal regulations require leachate collection and treatment systems for approved landfills, as well as monitoring wells at all new sites. Sampling of groundwater at the landfills is the responsibility of both the operator and DEP.

There are approximately 400 solid waste land disposal facilities registered with the state, including compost facilities for the disposal

of leaves and tree parts. Three hundred and fifteen of the facilities are sanitary landfills registered with the Department. Of these, 161 (52%) are privately owned and operated, while 154 (48%) are publicly owned and operated. There are eight chemical and hazardous waste treatment facilities within the state; however, there are no landfills registered that are permitted to take hazardous or toxic waste and dispose directly onto the land. Of the 350 total disposal facilities, about 250 have an ultimate capacity of 150,000 tons or less, while approximately 40 have a capacity of more than 500,000 tons.

Twelve percent of the landfills are estimated to handle about 60% of the total disposal. Much of the disposal problem is concentrated in the state's major industrial regions: the New York City and Philadelphia metropolitan areas. In studies done for the Interstate Sanitation Commission in 1975 and 1976, the New York City metropolitan area (which includes nine New Jersey counties) produces seven hundred tons of sludge per day. Eighty percent is barged to sea while the remainder is landfilled, incinerated, or disposed of by other means. The studies concluded that a regional sludge management plan is needed to incorporate several methods of disposal to reduce the dangers of contamination of land and groundwater due to toxic ingredients in the sludge. Pyrolysis is considered to be the best solution for most of the sludge.

New Jersey is controlling some of its solid waste problems through resource recovery projects. Presently there is one partially operated resource recovery facility in Monmouth County. This facility shreds materials and will eventually take out the ferrous and sell the remainders to be burned in the boiler system. There are two in the advanced planning

stages. The first facility is in Newark, and it will recover at a rate of approximately 90%. The other facility is the Hackensack Meadowlands Development Commission which is in the first planning stages of development.

One problem encountered with recovery projects is that of finding available markets for recovered materials. A study done by the City of Philadelphia, which included 3 surrounding New Jersey counties, concluded that the most marketable product in the area is energy (in the forms of steam, refuse derived fuel, electricity, gas, and oil.)

B. Workforce Profile

New Jersey's solid waste program has a current staffing level of 40 people. This represents an increase of ten over last year's level. The current level can be divided into four occupational categories as indicated in the following table. The largest category is engineers, who comprise about half of the program. Their degrees are primarily in chemical, civil, mechanical, and environmental engineering. There are also ten persons classified as scientists with educational backgrounds as chemists, sanitarians and geologists. The qualifications require a bachelor's degree in a physical or natural science, or engineering. Three persons are technicians, positions which do not require a professional degree. Normally the technicians have completed some college work or have had prior work experience. The "other" category includes clerical and administrative personnel. Additional workforce in solid waste exists at the community level in landfill operations and waste collection and in the private sector in landfill operations, collection,

and resource recovery. These activities are conducted on a local basis and operate independently of one another, and as a result, no readily available staffing configuration exists. However, additional workforces in Solid Waste activities with regard to daily operations is applied by the counties and local health officers.

TABLE XV

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Solid Waste Administration
Current (1976) Staffing Level

Position	1976
Engineer	19
Technician	3
Scientist	10
Other	8
TOTAL	40

C. Workforce Projections

Data contained in this section are based on the best professional judgement of persons working in the programs and materials and documents supplied by them.

Officials within the Solid Waste Administration anticipate that the staffing level will double within the next two years. The primary reason for this large increase is the recent upgrading of the program from bureau to division status. Another reason is the increase in the planning and design and hazardous and chemical wastes. Depending on funding from the Federal Government, additional employees may be required by the passage of the Resource Conservation and Recovery Act, and the projections

are based upon this and with the implementation of the revised Solid Waste Management Act which was Chapter 326 of the Public Laws of 1975. The projections in the following table show the largest percentage increase to be technicians, although this category is expected to be the smallest in number. Generally, the increase will occur in all occupational categories and job requirements are expected to remain the same as current requirements.

TABLE XVI

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Solid Waste Administration
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	10	11	36	36	36	36	N/A	47%
Technician	8	13	13	13	13	13	N/A	13%
Scientist	10	13	17	17	17	17	N/A	12%
Other	12	19	21	21	21	21	N/A	14%
TOTAL	40	56	87	87	87	87		19%

After the large initial increase, the staffing level is expected to stabilize and show only a small annual increase. This continued growth is anticipated as a result of increased activity in resource recovery and recycling with a phase-out of the sludge program anticipated by 1981.

It was not possible to obtain local and private workforce projections for much the same reasons as discussed in the workforce profile section. The fact that local jurisdictions and industry operate independently of one another makes it virtually impossible to get an accurate projection.

D. Training and Certification

The Department's Bureau of Manpower Planning and Staff Development (BMPSD) is responsible for the Solid Waste Administration's training programs. Training is provided to community officials through a contract between the Manpower Office and Rutgers University. Two courses that have been conducted in solid waste activities include a landfill operator's course, in which approximately 150 per year are trained, and seminars for local health officials to train them to assist the Solid Waste Administration in enforcement activities.

The SWA also provides an informal on-the-job training program to new personnel to acquaint them with the solid waste law and regulations and activities of the Administration. BMPSD also has a $3,000 contract with Rutgers to conduct training for Bureau staff. It is anticipated that with the large staffing increase in the next two years, a formal in-house training program will be initiated.

E. Career Potential

The outlook for future careers in solid waste management in New Jersey appears to be good. A large staffing increase is anticipated partially due to the upgrading of the program. An increased federal commitment to solid waste management through the Resource Conservation and Recovery Act along with a number of resource recovery facilities coming into operation over the next several years is indicative of the growth that can be expected.

Careers will tend to move away from the conventional landfill and incinerator operators to more highly trained individuals for resource recovery operations. The greatest opportunities will exist for engineers and scientists in the planning, design, and operation of these facilities. Although the demand for landfill operators can be expected to decline, a certain number of these positions will continue to exist for the forseeable future, since resource recovery is not practical in many smaller communities and rural areas.

F. Conclusion

New Jersey is in the process of expanding its solid waste management activities with the upgrading of its program's status. Landfills account for about 60% of the total waste disposal, which is largely concentrated in the New York City and Philadelphia metropolitan areas.

The program currently employs forty people and this number is expected to double in the next two years. The increased federal committment, through the Resource Conservation and Recovery Act, to solid waste management and the increasing activities in resource recovery are anticipated to provide more jobs in this area in the future. Professionals such as engineers and scientists will be the most widely utilized for these activities.

VII. WASTEWATER

A. Introduction

In New Jersey, the State Department of Environmental Protection (DEP) has the legal authority and responsibility for the control of water pollution and water quality planning and management. These programs are administered within the Department by the Division of Water Resources. The program objectives are to preserve, enhance, and restore the quality of the State's water resources for maximum beneficial uses. The thrust of the program is to enable the state to assure the lead agency role in meeting the water quality goals expressed in the Federal Water Pollution Control Act of 1972. Some of the major priorities include:

- efficient management of the wastewater treatment plant construction grant program;
- water quality management planning for both point and non-point sources;
- development and operation of comprehensive water quality monitoring network;
- assume responsibility for the NPDES Program which is currently being administered by EPA.

B. Workforce Profile

The information contained in this section was provided primarily through on-site interviews with professionals working in the water quality program and through the use of materials and documents supplied by them.

The Division of Water Resources is divided into seven major units for implementation of the water quality program. The following is a listing of these units which is taken from the New Jersey Water Pollution Control Program for Fiscal Year 1976-1977, as provided by program officials:

1) Program Management and Division Administration-Office of Director;
2) Water Resources Planning and Management Element;
3) Water Pollution Control Monitoring, Surveillance and Enforcement Element;
4) Public Wastewater Facilities Element;
5) Water Supply and Flood Plain Management Element;
6) Office of Legal Services; and
7) Office of Environmental Assessment.

To carry out its activities, the Division has a staff of 273 at this time. They are grouped into the occupational categories of engineer, scientist, technician, and others, as illustrated in the following table. The engineers are primarily environmental engineers, which require a minimum of a bachelors degree in an engineering discipline such as civil, sanitary, mechanical or environmental. The scientists include environmental specialists, biologists, chemists, and geologists. A bachelor degree in the physical or natural sciences or related engineering fields is required for these positions. The technicians are environmental technicians, construction inspectors, and operating personnel. These positions require a high school education, however, some degree of college work is desirable and can be substituted for a

certain amount of work experience. The "Other" category includes secretarial and clerical personnel, accountants, program development specialists, machine operators, maintenance personnel and laborers.

TABLE XVII

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Water Resources
Wastewater Programs
Current (1976) Staffing Level

Position	1976
Engineer	74
Scientist	48
Technician	62
Other	89
TOTAL	273

In addition to the Department of Environmental Protection, the State Department of Health is also involved in New Jersey's water quality program. Through the Department's Division of Laboratories, it functions as the service center for most water quality laboratory work required by the Division of Water Resources, including the performance of chemical, physical, and bacteriological analyses.

Current staffing within the Health Department of water quality consists of ten persons. Five are chemists, and five are lab technicians, with job requirements being similar to those of the DEP. The staff works in three specific activity areas of water quality, which can be broken down as follows:

1) Sewages: two chemists, two lab technicians;

2) Industrial Wastes: two chemists, 2 lab technicians;

3) Quality Control: one chemist, one lab technician.

Current estimates indicate that there are 1,042 certified wastewater treatment operators in New Jersey. Four classifications of waste or sewage treatment plant operators exist in New Jersey as provided for in regulations of DEP. The classifications are S-1, S-2, S-3, and S-In, with the last category relating only to industrial waste treatment plants. A description of the four classifications is as follows:

1) S-1: All biological and/or chemical coagulation treatment plants with approved design capacities of more than 250,000 gallons per day. All plants comprising primary treatment only with an approved design capacity of 5,000,000 gallons per day or more.

2) S-2: All biological and/or chemical coagulation treatment plants with approved design capacities of less than 250,000 gallons per day.

3) S-3: All primary treatment plants with approved capacities of less than 5,000,000 per day.

4) S-In: All industrial waste treatment plants. This classification of license shall be limited to use for the particular treatment facility to which it applies, except as permitted in Section 9.

Generally, S-1, S-2, and S-3 classifications require a college degree related to the engineering field and/or actual working experience in accordance with state regulations for each specific classification. The S-In classification requires education and/or experience that is acceptable to the Department, with successful completion of a course in Industrial Waste Treatment.

C. Workforce Projections

The data obtained for this section were derived from on-site interviews with program professionals, representing their best judgements, and from materials and documents they were able to supply.

Substantial growth in New Jersey's water quality program is anticipated by program officials. The growth rate amounts to about 15 percent per year over the next five years with the bulk of the growth coming in the next year. Program professionals have estimated a need for a 50 percent staffing increase over the next year, followed by increases of only 5 to 10 percent per year thereafter. This is reflected in the following table. Because program officials expect job classifications to remain the same, educational requirements will likely be the same as indicated in the previous section. The staffing increase is expected to be about the same for all categories, with only slightly higher increases expected for engineers and scientists.

TABLE XVIII

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Water Resources
Wastewater Programs
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum growth (average)
Engineer	74	111	121	130	136	139	15%
Scientist	48	72	79	85	89	95	16%
Technician	62	93	102	109	114	115	15%
Other	89	134	144	150	155	156	13%
TOTAL	273	410	446	474	494	505	14%

The Division has based its projections of increased staffing needs on the four main activities of the water pollution control program, and the goals they hope to accomplish. The following is exerpted from the New Jersey Water Pollution Control Program for Fiscal Year 1975-1976 and outlines the five-year goals of each program. The table which follows the goals listed below illustrate the workforce requirements in person-years to achieve those goals.

Director's Office (Legal, Fiscal, Administrative, Program Development, Environmental Assessment):

1) Develop regulatory framework and statutory changes or additions for accomplishment of our long-range water resource objectives.

2) Develop ability to provide complete environmental assessment of all major water resource projects.

3) Develop and implement a comprehensive management-by-objective system including an adequate and meaningful reporting to public.

4) Complete development of policies, guidelines and procedures for all Division programs.

5) Develop a continuing program review and evaluation capability.

Water Quality Planning and Management:

1) Complete comprehensive water quality management plans for the entire state and initiate implementation of recommended programs and projects.

2) Develop a water quality standards revision process and revise water quality standards where necessary on a continuing basis.

3) Develop a comprehensive statewide groundwater quality management program.

4) Implement an adequate laboratory support and quality assurance program including an adequate data storage and retrieval system.

5) Maintain and operate a statewide water quality assessment related to water uses and cost-benefits relationships.

Pollution Control, Monitoring, Surveillance and Enforcement:

1) Assume full responsibility for the NPDES program including legislative authority, administration of permits, compliance assurance and enforcement of permit conditions.

2) Establish an adequate groundwater monitoring and enforcement program similar to the one for surface waters.

3) Expand the oil and hazardous spill response group which will improve our capability for investigating and follow-up on a larger percentage of reported spills.

4) Develop and institute a vigorous enforcement program based on adequate and up-to-date legislative authority and procedures to achieve state and national goals for water quality.

Public Wastewater Facilities:

1) Expand and operate an adequate computerized project management and tracking system for both federally funded and locally funded projects.

2) Assume major responsibility for the administration of federal construction grant program including plan and specification review.

3) Complete construction of all major regional and local public wastewater treatment projects to provide a minimum of secondary treatment as mandated by P.L. 92-500.

Staffing projections for the Department of Health water quality activities were impossible to obtain in specific numbers. Program personnel indicated, however, that the number would increase in proportion to DEP's activities. Therefore, it can be assumed that the Health Department may require a doubling in staff from ten to twenty persons.

D. Training and Certification

DEP has the responsibility for ensuring that adequate training is provided for wastewater operations personnel. The Department's Bureau of Manpower Planning and Staff Development coordinates this activity. Training which is necessary to meet licensing requirements is provided by the community college system and augmented by short courses and seminars sponsored by DEP and U.S. EPA.

Basic policy for operator training is set by the Commissioner's Advisory Council on Water and Wastewater Operator Training, in which DEP is represented along with schools offering operator training courses and organizations involved in water pollution control. This Council sets the curricula for operator training courses offered throughout the state by vocational/technical schools and community colleges. Training includes introductory, advanced, industrial waste treatment, and laboratory analysis courses. Rutgers University has applied for a federal grant to construct a statewide operator training center and is currently developing a central resource library for wastewater plant personnel.

E. Career Potential

Based on projections of professionals working in the program, the outlook for future careers in the wastewater program in New Jersey appears promising. Demand in the Water Resources Division for trained engineers, scientists, and technicians can be expected to double over the next five years. Opportunities will be best for persons with professional training in such areas as civil, sanitary, environmental or mechanical engineering, and biology, chemistry and geology.

Opportunities are also expected to exist in the Health Department for chemists and laboratory technicians for the performance of chemical, physical, and bacteriological analyses.

F. Conclusion

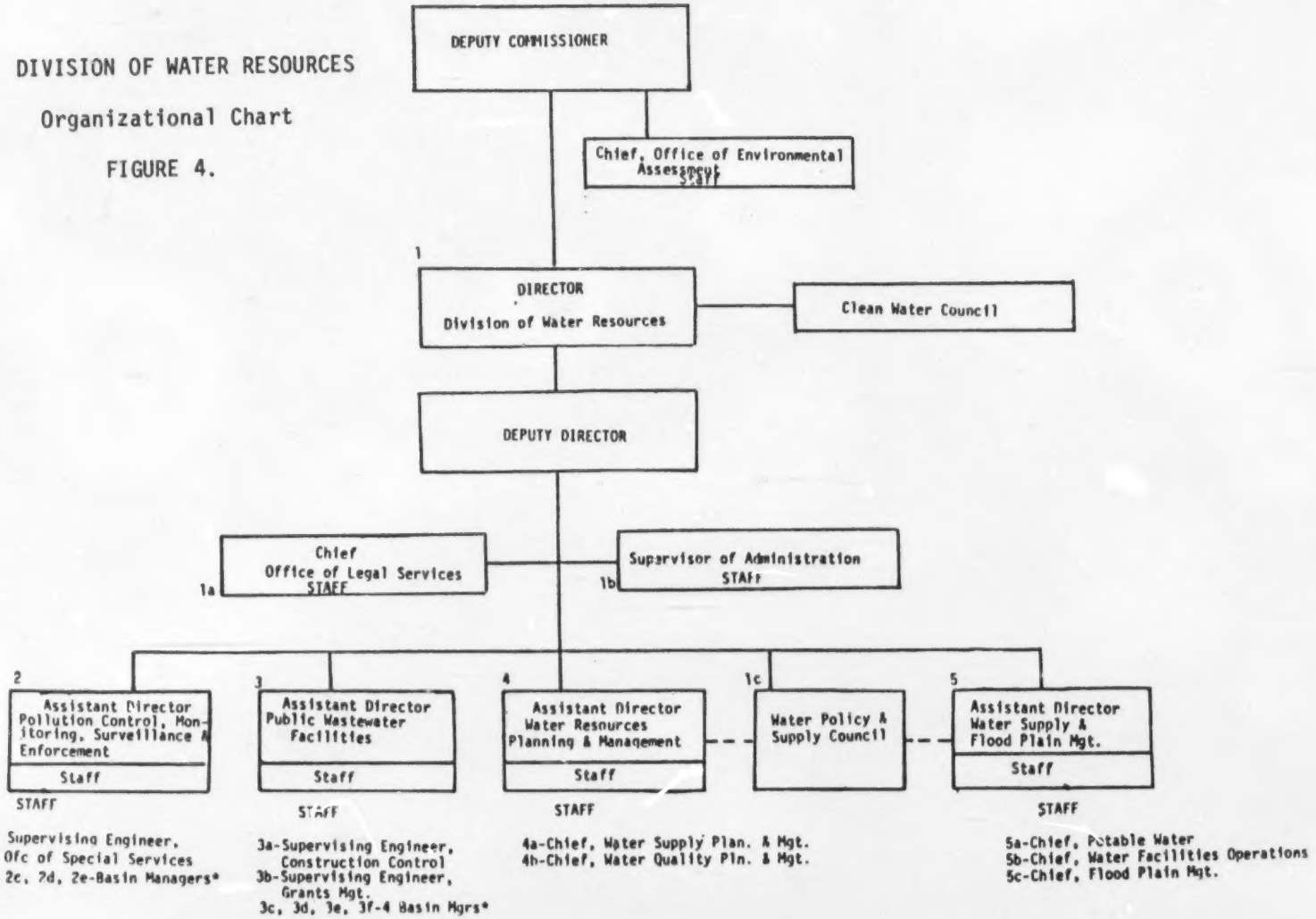
The wastewater program in New Jersey is administered by the Department of Environmental Protection with laboratory services provided by the Department of Health. Training programs for Department personnel and treatment plant operators are conducted through the Office of Manpower Planning and Staff Development within the Department.

The current staffing of 273 is expected to increase by approximately 15 percent per year over the next five years. Opportunities will be available for persons with professional training in engineering and the natural sciences and for non-professional technical persons.

DIVISION OF WATER RESOURCES

Organizational Chart

FIGURE 4.



*Atlantic Basin, Delaware Basin, Passaic-Hackensack Basin, Raritan River & Interstate Sanitation Commission

VIII. ENERGY

A. Introduction

New Jersey is currently heavily committed to the construction of nuclear power electrical generating plants. Two plants are now operating; six more are planned or under construction and anticipated to be completed by the late 1980s. Should all be completed, they will have a generating capacity of 8,349 megawatts.

The Cabinet Energy Committee, created by Executive Order to advise the Governor relative to the development and implementation of energy policy for the state, is made up of the administration of the State Energy Office, the Attorney General, State Treasurer, the Counsel to the Governor, and Commissioners of Labor and Industry, Department of Environmental Protection, Department of Public Utilities, Community Affairs, and Transportation.

The Energy Crisis Study Commission is an investigatory commission composed of private citizens, cabinet officers, and legislators created by the legislature to study energy-related matters. The Commission also is charged to identify and analyze energy problems and recommend policy action, to promulgate regulations for the sale of motor gasoline, and to coordinate energy matters among the various Departments of the State. The staff of nine has engaged in the following activities:

1) Coordination of the development of a State Energy Master Plan;

2) Development of a data collection procedure to facilitate decision-making and to monitor the impact of decisions;

3) Development of a statewide construction code with an energy component including residential retrofitting, and commercial/industrial new construction impact statements;

4) Development of stand-by energy programs to deal with shortages; and

5) Projections of energy supply and demand.

Selected Post Secondary Institutions With Formal Environmental Energy Programs

There are several colleges and universities in New Jersey which offer programs in environmental science and pollution control technology. Information on these programs was gathered from college catalogues selected on the basis of recommendations by professionals in the field, and phone calls to department heads. Only a small percentage of the schools in the state were included in our sample; thus, the programs outlined in this section simply represent the kinds of pollution control training available in the state at the two year, four year, and post graduate college levels. These programs are designed to prepare students for technical or professional positions in pollution control and related areas.

Included in this section are Stockton State College, which offers both B.A. and B.S. degrees in Environmental Studies with options in Environmental Science & Analysis, Management & Planning, and Environmental Issues, and the Middlesex County College, which offers a Technician Training Program in Environmental Health Sciences leading to an A.A.S. Degree. Not included in this section, but significant to the overall environmental education program in in the state is the program offered at Cook College, Rutgers, the State University of New Jersey. In addition to the undergraduate and graduate curricula, Cook College also conducts environmental training for the state's Department of Environmental Protection. Adequate information concerning the courses and number of students/ graduates was not available at the time of the preparation of this report.

SENIOR INSTITUTIONS

Richard Stockton State College
Pamona, New Jersey

Program: Environmental Studies (B.S. or B.A. with options in Environmental Science & Analysis, Management & Planning and Environmenal Issues

Hours required for major: Units - (B.S.) 80, (B.A.) 64
Program Inception: 1971
Staff Size: Four associate professors, eight assistant professors, and one instructor.
Enrollment: 330
Graduates (1976): not available at this time
Placement: not available
Graduate Work: not availalbe

Courses

Introduction to Air Pollution Control
Water Quality
Environmental Chemistry Methods
Geomorphology: Terrain Analysis
Hydrology
Environmental Geology
Mineral Resources
Introduction to Soils
Cartography
Population Biology
Entomology
Dendrology
Introduction to Forestry
Introduction to Wildlife Management
Introduction to Freshwater Fisheries
Advanced Wildlife Management
Aquatic Ecology
Field Methods
Field Ecology of South Jersey
Environmental Economics
Environmenal Law
Introduction to Regional Science
Planning and Politics
Land Use Law
Environmental Systems Analysis
Environmental Education
Environmental Impact Assessment I, II

COMMUNITY COLLEGES/TECHNICAL INSTITUTIONS

Middlesex County College
Edison, New Jersey

Program: Technician Training in Environmental Health Science (A.A.S.)

Hours required for major: Semester - 68
Program Inception: 1971
Staff Size: Two associate professors, two instructors
Enrollment: 58
Graduates: 10
Placement: 6
Graduate Work (B.S.): 4

Courses

Biology I, II
Chemistry I, II
Introduction to Computers
English I, III
Health
Mathematics I, II
Principles of Physics
Physical Education
Microbiology
Atmospheric Pollution Control
Advanced Wastewater Operations I, II
Advanced Water Operations I, II
Community Sanitation
Physical Education
Social Science Elective
Environmental Microbiology
Industrial Hygiene
Water and Wastewater Analysis
Environmental Internship
Social Science

State Legislation

NEW JERSEY GENERAL

TITLE:

Department of Environmental Protection Act
New Jersey Statutes Annotated 13:1D-1

PURPOSE:

To provide for a coordinated state policy on environment through the creation of a Department of Environmental Protection.

DEFINITIONS:

1. Commissioner
2. Construction permit
3. Department

ADMINISTERING AUTHORITY:

Department of Environmental Protection
Division of Environmental Quality

AUTHORIZATIONS:

To assume certain functions of the Department of Conservation and Economic Development, the Division of Clean Air and Water [illegible]e Department of Health, and the Department of Agriculture;
To develop pollution abatement and conservation policies;
To require registration of possible polluting activities;
To enter and inspect property in enforcement of the act;
To provide local assistance on environmental and conservation matters;
To establish and maintain laboratories;
To enforce the state air, water and solid waste laws;
To administer the state construction grant program.

NEW JERSEY GENERAL

TITLE:

Environmental Rights Act
New Jersey Statutes

PURPOSE:

To allow citizen protection of the environment by expanding court access in environmental matters.

DEFINITIONS:

1. Person
2. Pollution

ADMINISTERING AUTHORITY:

Citizens of the State

AUTHORIZATIONS:

To bring action to force enforcement of environmental laws and regulations;
To seek state agency action in enforcement of pollution laws.

NEW JERSEY AIR

TITLE:

Air Pollution Control Act
New Jersey Statutes 26:2C-1

PURPOSE:

To provide for a coordinated program of air pollution abatement and the creation of a clean air council.

DEFINITIONS:

1. Council
2. Department
3. Air pollution
4. Commissioner
5. Control apparatus
6. Equipment
7. Person

ADMINISTERING AUTHORITY:

Department of Environmental Protection
Clean Air Council

AUTHORIZATIONS:

To study air pollution control and programs;
To issue regulations pursuant to the act;
To issue standards for motor vehicle emissions;
To generally supervise and control air pollution matters;
To declare air pollution emergencies and take proper action.

PROHIBITED ACTS:

To violate any air emergency orders;
To interfere with enforcement of the act;
To construct or install control apparatus without permit;
To cause or allow air pollution in violation of the act.

PENALTIES:

Emergency violations - fines of up to $100,000 or ten years imprisonment;
General violations - fines of up to $2,500 per day.

NEW JERSEY NOISE

TITLE:

Noise Control Act of 1971
New Jersey Statutes 13:1G

PURPOSE:

To control and abate noise sources degrading to the quality of life or endangering health.

DEFINITIONS:

1. Commission
2. Council
3. Department
4. Noise
5. Person

ADMINISTERING AUTHORITY:

Department of Environmental Protection
Noise Control Council

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To conduct noise hazard research;
To supervise statewide noise control programs;
To require excessive noise operation registration;
To enter and inspect property in enforcement of the act;
To control motor vehicle noise;
To submit recommendations relating to noise control.

PROHIBITED ACTS:

To violate any act provisions or regulations;
To interfere with enforcement of the act.

PENALTIES:

Fines of up to $3,000.

NEW JERSEY PESTICIDES

TITLE:

Pesticide Control Act of 1971
New Jersey Statutes 13:1F-1

PURPOSE:

To protect man and the environment from the adverse effects of pesticides through a coordinated program of pesticide control and regulation.

DEFINITIONS:

1. Commissioner
2. Council
3. Department
4. Person
5. Pesticide

ADMINISTERING AUTHORITY:

Department of Agriculture
Pesticide Control Council

AUTHORIZATIONS:

To study the use, application and disposal of pesticides;
To make recommendations concerning pesticide control needs;
To issue regulations and enforce the act;
To classify pesticides and restrict their usage;
To enter and inspect property in enforcement of the act;
To require registration of pesticides;
To license pesticide dealers;
To establish certification standards.

PROHIBITED ACTS:

To sell, purchase or use pesticides which may cause adverse effect on the environment contrary to regulations;
To dispose of embargoed pesticides;
To violate labor requirements;
To violate other act provisions.

PENALTIES:

Fines of up to $3,000.

NEW JERSEY RADIATION

TITLE:

Radiation Protection Act
New Jersey Statutes 26:2D

PURPOSE:

To provide for a comprehensive program of radiation protection and control.

DEFINITIONS:

1. Commission
2. Department
3. Unnecessary radiation

ADMINISTERING AUTHORITY:

Department of Environmental Protection
Commission on Radiation Protection

AUTHORIZATIONS:

To evaluate radiation hazards;
To issue regulations pursuant to the act;
To cooperate with other state and federal agencies;
To require radiation source radiation;
To inspect radiation sources;
To issue emergency orders.

PROHIBITED ACTS:

To violate the terms of any license;
To violate any act provisions or regulations.

PENALTIES:

Fines of up to $2,500.

NRC AGREEMENT STATE: No

NEW JERSEY SOLID WASTE

TITLE:

Solid Waste Management Act
New Jersey Statutes 13:1E-1

PURPOSE:

To provide a framework of solid waste collection and disposal to protect the health, safety and environment of citizens of the state.

DEFINITIONS:

1. Solid waste
2. Solid waste collection
3. Solid waste disposal
4. Solid waste management
5. Council
6. Department
7. Commissioner
8. Solid waste facilities
9. Public authority
10. Hackensack Meadowlands District
11. Hackensack Commission
12. Existing solid waste facility
13. New solid waste facility
14. Public sewage treatment plant
15. Resource recovery
16. Recycling facility

ADMINISTERING AUTHORITY:

Department of Environmental Protection
Advisory Council on Solid Waste Management

AUTHORIZATIONS:

To supervise and register local solid waste facilities;
To conduct solid waste disposal research;
To issue regulations pursuant to the act, including environmental impact statement requirements for solid waste facilities;

AUTHORIZATIONS (Cont'd):

To develop a statewide management plan;
To order the construction and operation of local facilities;
To make recommendations on solid waste plans and legislation;
To supervise plans and actions of solid waste management districts.

PROHIBITED ACTS:

To operate a solid waste facility without proper registration;
To violate any rules adopted pursuant to the act.
To collect or transport solid waste without proper registration;

PENALTIES:

Fines of up to $3,000 per day.

NEW JERSEY SOLID WASTE

TITLE:

Waste Control Act
New Jersey Statutes 13:1I-1

PURPOSE:

To control the environmental threat presented by the volume of liquid and solid wastes and its disposal hazards.

DEFINITIONS:

1. Commission
2. Department
3. Solid waste
4. Person

ADMINISTERING AUTHORITY:

Department of Environmental Protection

AUTHORIZATIONS:

To issue regulations regarding treatment and disposal of out-of-state waste;
To enforce the act.

PROHIBITED ACTS:

To bring solid or liquid waste into the state without permit.

PENALTIES:

Fines of up to $3,000.

NEW JERSEY WASTE WATER

TITLE:

Clean Ocean Act
New Jersey Statutes 58:10-23.25

PURPOSE:

To prevent pollution to waters of the state through control of ocean waste disposal.

DEFINITIONS:

1. Commissioner
2. Department
3. Vessel
4. Person

ADMINISTERING AUTHORITY:

Department of Environmental Protection

AUTHORIZATIONS:

To issue regulations relating to loading of vessels and disposal of materials at sea;
To require ocean dumping permits.

PROHIBITED ACTS:

To engage in unauthorized ocean dumping;
To violate any regulations issued under the act.

PENALTIES:

Fines of up to $3,000.

NEW JERSEY POTABLE WATER/WASTE WATER

TITLE:

Superintendent and Operator Licensing Law
New Jersey Statutes 58:11-14

PURPOSE:

To provide for the licensing of operators and superintendents in water supply, water treatment and sewage plants.

DEFINITIONS:

1. Superintendent or operator
2. Public water treatment plant
3. Public sewage treatment plant
4. Public water supply system
5. Department
6. Rules and regulations
7. Waters of this state

ADMINISTERING AUTHORITY:

Department of Environmental Protection

AUTHORIZATIONS:

To conduct examinations for licenses;
To license operators and superintendents;
To enforce the act.

CERTIFICATION OR LICENSING:

Superintendents or operators of water supply, sewage, water treatment facilities must be licensed; provision made for prior operators and private plants.

PROHIBITED ACTS:

To operate a water treatment facility by unlicensed operator;
To perform the duties of an operator or superintendent without proper licensing.

EXEMPTIONS:

Registration and other fees not required of private plants.

PENALTIES:

Fines of $10 per day.

NEW JERSEY WASTE WATER/POTABLE WATER

TITLE:

Water Pollution Control Laws
New Jersey Statutes 58:10-1

PURPOSE:

To provide for a water pollution control program and for its general enforcement.

DEFINITIONS:

1. Fresh water
2. Person
3. Sludge acid
4. Municipality
5. Department
6. Water supply system
7. Approved public potable water supply
8. Unapproved water supply
9. Physical connection
10. Approved physical connection

ADMINISTERING AUTHORITY:

Department of Environmental Protection
Division of Water Resources

AUTHORIZATIONS:

To supervise the purity and pollution of state waters;
To administer the pollutant discharge permit program;
To enforce and pursue civil actions under the act;
To approve potable water supplies prior to use;
To supervise water plant operations;
To issue regulations pursuant to the act.

PROHIBITED ACTS:

To cause water pollution in water supply area;
To cause or allow pollution to any fresh water;
To operate factories or similar facilities in a watershed without prior approval;
To cause the discharge of sludge acid into waters of the state;
To construct or operate water purification facility without prior approval.

PENALTIES:

A wide range of fine from $50 to $3,000 is established depending on the type of violation and whether or not it is initial offense.

NEW JERSEY WASTE WATER

TITLE:

Water Quality Improvement Act of 1971
New Jersey Statutes 58:10-23.1

PURPOSE:

To provide for the control of discharges of petroleum products, debris and hazardous substances into waters of the state.

DEFINITIONS:

1. Petroleum products
2. Hazardous substances
3. Discharge
4. Remove
5. Waters
6. Department
7. Person
8. Act of God
9. Debris

ADMINISTERING AUTHORITY:

Department of Environmental Protection

AUTHORIZATIONS:

To supervise enforcement of the act;
To supervise pollutant discharge cleanup operations.

PROHIBITED ACTS:

To discharge petroleum products, debris or hazardous substances into waters of the state;
To fail to notify the Department of any discharges;
To violate other act provisions.

EXEMPTIONS:

Discharges caused by act of war or act of God.

PENALTIES:

Fines of up to $3,000;
Liability also imposed for cost of all cleanup operations.